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[OFFICIAL NOTICE.]

Fourth Annual Meeting of the Ohio Gas Light Association.

To the Members of the Ohio Gas Light Association:—Gentlemen: As heretofore announced the Fourth Annual Meeting of this Association will be held at Sandusky, Ohio, convening at 10 A.M., March 21, 1888, and continuing two days.

Our headquarters will be the Sloane House, where the very reasonable rate of $2 per day has been secured for members and their families and visitors in attendance at the meeting. The several sessions will also be held in a suitable room in the hotel.

Arrangements have been made whereby the members can, if they so desire, devote a portion of the afternoon of the second day of the meeting to an excursion to Findlay, where the famous Karg well will be lighted for their edification. The excursion train will return to Sandusky the same evening, and the rate for the round trip will be $1.80 *per capita*.

The following papers are promised for the meeting:

"The Use of Lima Crude Oil for Carburetting Water Gas," by Geo. H. Christian, Norwalk, O. "Policy of Gas Companies as to Incandescent Electric Lighting," by F. W. Day, Columbus, Ohio. "Methods of Inducing Non-Consumers to Use Gas," by J. W. Alexander, Painesville, O. "A few Words on Incandescent Gas Lighting," by Geo. W. Graeff, Jr., Phila., Pa. "Natural Gas and its Effect on the Consumption of Coal Gas," by E. B. Philipp, Findlay, O. "The First Cost of Gas Stoves and Engines," by E. C. Gwyn, Springfield, O. "Fuel Gas," by J. M. Critchlow, Pittsburgh, Pa. "The Legality of Making more than One-Year Contracts with Cities," by Herman Wilkiemeyer, Lancaster, O. "Personal Experiences with Naphthaline," by Edward Lindsley, Cleveland, O. "The Management of Small Gas Works," by P. J. Wood, Wilmington, O. "The Effect of Specific Gravity, Atmospheric Pressure and Temperature upon the Consumption and Candle Power of Illuminating Gas," by J. Gwynn, Fostoria, O. "Purification in Closed Vessels" by Geo, Shepard Page, New York City. "An Experience with Choked Stand-pipes," by Moses Coombs, Jr., Youngstown, O. "Our Future Prospects," by Thos. Wood, Sandusky, O.

It is hoped that the above list, together with other attractions of the meeting, will be a sufficient inducement for every member to be present and help make the discussions interesting and profitable. And it is especially urged upon all gas men of the State, who are not already members of the Association, to make their arrangements to attend this meeting, and be convinced of the advantages and desirability of membership therein. Respectfully, IRVIN BUTTERWORTH, SECY.

[OFFICIAL NOTICE.]

Eleventh Annual Meeting of the Western Gas Association.

SECRETARY'S OFFICE, WESTERN GAS ASSOCIATION,
QUINCY, ILL., Feb. 24, 1888.

The Eleventh Annual Meeting of the Western Gas Association will be held at Chicago, Ill., on the 9th, 10th and 11th days of May.

Messrs. Henry Pratt, E. H. B. Twining, and Geo. C. Hicks, our able, energetic and hospitable Committee of Arrangements, have chosen the

Grand Pacific Hotel for our hostelry, and have secured a hall in its immediate vicinity, which, from a personal inspection thereof, your Secretary unhesitatingly pronounces admirably adapted for our Association's requirements. If our Eleventh Annual is not an unqualified success the fault will not be due to any lack of judgment or foresight on the part of our Committee of Arrangements.

To refresh the memory of those present at the last meeting of our Association, and for the information of those who were not, your Secretary would call respectful attention to the unanimous passage on that occasion of the following resolution:

"*Resolved*, That there shall be a special committee appointed, to consist of the President, the two Vice-Presidents and the Secretary, who shall have authority to select and assign subjects to members and call for the writing of papers thereon."

In order to carry out both the spirit and the letter of the above resolution, the members of the special committee therein mentioned held a meeting recently, and have chosen subjects for papers which, in the Committee's judgment, will be of marked interest to the greatest number. Your Secretary has already notified those to whom papers have been allotted, and it is to be hoped and believed, since the foregoing resolution was passed without a dissenting voice, that a refusal to comply with your Committee's request is too improbable, not to say absurd for consideration.

As we have a membership of something over 200, and the number of papers that have been assigned will not exceed ten or twelve, it naturally follows that there will be about 190 of us who will not be asked to contribute to the literary part of the programme of our Chicago meeting. Should there be any of this large majority of non-contributors who feel that they cannot wait until '89 before they are called upon for a paper, an opportunity will be given them to step to the front with their contributions on this occasion, as essays from volunteers will be fully as welcome as those papers which have been formally assigned.

An announcement of hotel rates, titles of papers, with the names of their authors, and other matters of interest to our members will be made later on in these columns. A. W. Littleton, Secy.

THE BOSTON MEETING.

The members of the Mother Association will have nothing to regret when they have, and at their leisure, examined the record of the proceedings of their XVIII. Annual Convention. Far from regretting that which took place on the occasion of the '88 reunion, we imagine they will have much cause for congratulation, and experience not a little pride in the certainty that the course of their Society is still "onward and upward, and true to the line." Flattering and consoling as this knowledge must be, it nevertheless remains incontrovertible that the weather clerk appears to be anxious to serve out odd atmospheric conditions to those who attend the New England meetings, varying the same seemingly with each successive season. For instance, '86 was memorable for the sudden affection conceived by the bridges for the beds of the streams over which they ordinarily served as avenues; '87 was remarkable for its mildness and good behavior; but to '88 was reserved the distinction of figuring as the blizzard year. Mind you, with the thermometer pointing to zero, and minus six, the breezes that blow in the vicinity of Boston are next of kin to those which a heartless Weather Bureau, during these and similar times, keeps reminding us are on the way either from Fort Garry or Yankton or some other place where Boreas and the Ice King appear to hold high carnival. However, the Parker House, with its staunch walls and watchful engineers, seems fully equal to the task on all occasions of keeping winter on the outside; at any rate, it managed to do so quite thoroughly a fortnight or so ago.

The first day's session was ushered in promptly by President Harbison, who had the satisfaction of noting the presence of 62 members, besides a goodly sprinkling of invited guests. Perhaps the most notable of these were Mr. F. E. Barker, of the Massachusetts State Gas Commission; Mr. J. L. Howard, who, apart from his creditable record as presiding officer of the Hartford (Conn.) Gas Light Company, has also served his State in high executive position; and Mr. H. C. Leonard, Secretary of the Portland (Oregon) Gas Light Company. Yet another was a lamb who consented to converse with the lion—Mr. Ridlon, of the Boston Electric Club. In fact, the attendance was about all that could be wished for, although it is undeniable that all would have hailed with genuine delight the faces of Rollins, of Worcester, and Sherman, of New Haven. The carefulness of Secretary Nettleton renders any mention here of routine matters connected with the conduct of the Society during the year unnecessary. All these details will be found elsewhere in our columns. The newly adopted preamble and articles of agreement of the Society are, in our opinion, excellent; the provision regarding the selection of associate members being very well framed. True to its traditions, the Association desires to remain in fact as well as in name a representative New England body. The Presidential address was rather brief, but it was to the point all over; and, if we may be permitted to read between the lines, it proves that Hartford is not yet ready to admit the passing profit inherent in an honestly-conducted electric light installation. Passing on to the papers, we have only to refer our readers to our issue of Feb. 16 for an expression of opinion concerning them. It may, however, be remembered that we then attempted to prophesy on which side of the high-power burner argument the sage of Cambridge would align himself; therefore we ought to be excused for here saying, "Didn't we tell you so?" It is also matter for congratulation that the photometrical research committee is to continue its labors. Amongst those who were not previously announced in the Journal by the Secretary as contributors of papers appear the names of Mr. W. A. Wood, of Boston, and Mr. C. A. Gerdenier, of Bridgeport. The latter gentleman's description of the "Walker Tar Extractor," and its efficacy, is the tribute of a practical engineer; further, Mr. G. saved the paper list from being monopolized by residents of the Bay State. By common consent it was determined that Mr. Wood's "Note Book" must be a veritable mine of valuable information, and were thankful to him for having so cleverly displayed the contents of a few of its pages. Possibly, his frankness may so act upon some of his fellows that they will hereafter examine and report upon the contents of their "individual memoranda."

There was one thing in connection with the Boston meeting which appeared to us decidedly novel, and that was the banquet. Not being in the confidence of the Parker House steward all speculation as to his base of supplies is fruitless; but one thing is quite certain. If he will agree to install himself permanently in New York, and serve here at all times a dinner of such excellence and profusion, at the price at which tickets for it were handed out by Secretary Nettleton, he will either become speedily rich or rapidly poor. The banquet was a complete success, everyone contributing something toward the pleasure of the occasion.

Since all the returns are now in, the universal verdict must of necessity be that the '88 annual was a thorough and complete success, the result of united and careful effort. Now for '89, under the administration of Nashua's Hon. gas man.

During the prevalence of an epidemic of whooping-cough in this city it is no unusual thing to see a score or more juveniles, romping in the purifying rooms of the various stations of the Consolidated Company, waiting to inhale the vapors which follow a "change in the boxes."

Correspondence

(The Journal is not responsible for the opinions expressed by correspondents.)

Injudicious Lighting Methods Adopted at the Ponce de Leon Hotel.

St. Augustine, Fla., Feb. 16, 1888.

To the Editor American Gas Light Journal:

I inclose a clipping, from the Palatka (Fla.) *Daily News*, in relation to the electric lights in the finest hotel in the world—the "Ponce de Leon," at St. Augustine, Fla. [The clippping is appended.—Ed.]

"*The Ponce de Leon in Darkness.*—While the guests of the Ponce de Leon Hotel were at dinner last evening all the lights suddenly went out, and by contrast Egyptian darkness prevailed. This was caused by overloading one of the dynamos on account of the great number of guests. At the hotel there was a continual call for more lights. The dynamos were called upon to do extra duty, causing an extra flow of electricity to the main feeders. The circuit on the main feeders is broken by fusible cut-outs. The wires will stand a certain pressure, and these cut-outs are made to stand a trifle less, and consequently will fuse before the feeders. By this ingenious arrangement the trouble can be quickly adjusted and at comparatively no cost, at the same time saving many dollars' worth of copper wire and many hours delay in lighting. The occurrence caused considerable confusion in the hotel for a short time."

The owner of this hotel, Mr. Flagler, is Secretary, and a large proprietor in the Standard Oil Company—a Company that derives a large share of its profits from the sale of naphtha and oil to gas companies. Notwithstanding, Mr. Flagler gives the lighting of his hotel to the electricians. Many of its rooms and halls have to be lighted during the day, which requires the dynamos to be run in the daytime. If the hotel had been piped for gas as well as wired for electricity, there never could have been a time when they would be in darkness, an occurrence now likely to happen at any moment—when "something breaks down." Last summer the Battery Park Hotel, at Asheville, N. C., was in darkness for several nights on account of the failure

of the supply of water which fed the boilers of the electric light plant. It is strange the craze for electric lighting is so strong that those who build large hotels neglect to provide for gas as well as electricity. Yours, "W."

How to Properly Estimate Leakage.

BOSTON, MASS., Feb. 21, 1888.

To the Editor AMERICAN GAS LIGHT JOURNAL:

I was pleased to see that your Rahway correspondent had taken up the subject of "leakage per mile of main." He is to be congratulated on having so small a loss as compared with the average for Massachusetts given by me. This is undoubtedly due very largely to his good care and vigilance, but partly, perhaps, to the fact that frost does not go so deep in Rahway as it does in and near Boston. So much in defense of the Bay State. I inclose a leaf from the Gas Commissioner's report for 1886, from which you will see that for 48 companies in Massachusetts the leakage runs all the way (as reported) from 49,785 cubic feet *per mile* per year, or 136 cubic feet per day, up to 560,226 cubic feet per year, or 1,800 cubic feet per day.

In my opinion, this is the *only* fair way to compare the leakages from which different companies suffer. Yours truly, *

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, Feb. 10, 1888.

The Gas Light and Coke Company.—Bribery and Corruption.—Mr. Lewis T. Wright on Coal Distillation.—Coal Gas for Brazing or Welding.—Sewer Ventilation.

The remarkable improvement in the affairs of the Gas Light and Coke Company, of London, to which I referred in my letter of August last, has been fully continued during the second half of the year 1887, so far as one may judge from the half-year's accounts which have just been published. Speaking roughly, they have reduced their expenditure £75,000, whilst at the same time their receipts for gas have increased to the extent of £30,000, and the residuals have been augmented to the extent of £52,000. So, altogether, the Company are about $750,000 better off than in the corresponding period of 1886. Now they are able to declare a 12½ per cent. dividend and carry forward a balance, whereas this time twelvemonth they had to draw upon the balance of undivided profit to make up a dividend of 12 per cent. We often hear about "burning the candle at both ends;" but it has been reserved for the Gas Light and Coke Company to show how to lengthen the candle at both ends, by cutting down expenses and at the same time increasing sales.

The directors have taken a step in the right direction, which is of sufficient importance to receive a paragraph all to itself. In order to stimulate the use of gas amongst the laboring classes, they have arranged to contract with any owners of workmen's tenements to put in the necessary services and internal distributing pipes for a small weekly rental. They will, of course, also arrange for weekly payments for the gas consumed, as otherwise the additional quantity so disposed of may not be attended with the necessary increase in receipts for gas. It is rather remarkable that, although a clause has been inserted in all the Gas Acts granted by Parliament during the last 40 years, giving full powers for the letting of all kinds of gas fittings on hire, scarcely anything has hitherto been done in this direction. Leaving out the practice of hiring out gas stoves and engines, and one or two exceptional cases, the hiring clause has been practically a dead letter. Probably it has been left out of sight because in most districts the demand for gas has increased quite as rapidly as it was convenient to provide for it. But now, with the electric light bogie continually before their eyes and cries of cheap oil in their ears, gas companies will do well to follow the example set by the Gas Light and Coke Company, and rouse up to a more enterprising frame of mind. The result of this new departure will be watched with much interest.

The question of commissions has lately been exciting some attention, the ball having been opened by a daily newspaper of the class favoring "sensational news," which sets forth, in the course of an article devoted to the subject, that nothing, from a gasholder down to the meters and wrought iron pipe, found its way into a gas company's yard, unless some commission was paid upon it to the manager. Now, the word "commission" creates some confusion with a perfectly legitimate and honorable way of doing business, and therefore I prefer to substitute the word "bribe" as better expressing the sense in which it is used in this case. That some amongst the class of gas managers make a rule of exacting "bribes" is not improbable, for there are black sheep in every flock. Dishonest persons are proverbially quick and cunning, and may sometimes find the position of gas manager the most favorable field for carrying on their nefarious practices that offers itself. But that the acceptance of any "bribe" beyond a box of cigars or a turkey at Christmas, which is regarded as a friendly present, is by any means a general rule amongst gas managers, I do not believe. That such statements should be proved before being circulated is nothing but common justice, and the proof should rest upon something stronger than the allegations of the supposed giver of the bribe. When secret service money in any form is voted it is always difficult to prevent jobbing. And if a person choose to send out travelers with limited or unlimited powers of bribery, what is to prevent the traveler from doing business in an honorable manner, but retaining in his own pocket the money which is supposed to have been expended in bribes? Things of this sort cannot be dealt with by general assertions.

Perhaps the present agitation will eventually result in a stoppage of what, at best, can only be termed doubtful practice. If so, we will have gained something, not the least of which, perhaps, may accrue from the foreshortening of the artful attempts of the briber in other fields than that allotted to the gas manufacturer.

Mr. Lewis T. Wright, of the Nottingham Corporation Gas Department, recently read a paper on "Studies in Coal Distillation," before the London section of the Society of Chemical Industry. As was to be expected, the speaker treated his subject in a thoroughly lucid manner, and the points made are well worthy of a close study. He discussed the matter under three divisions in respect of the effect of the varying heats of distillation—*i. e.*, as to the quality of the resultant tar, on certain sulphur compounds, and on the ammonia. He follows out the effect of the various temperatures upon the constitution of the tar at considerable length, and his researches show that at high temperatures large portions of the crude naphtha, the light oils, and even of the creosote oil are decomposed. From this it may be judged that if proper precautions are observed the advantage of working at high heats is an enrichment of the gas by the addition of certain quantities of naphtha and light oil that otherwise would have gone down with the tar. These substances must be as valuable if retained in the first place as if added afterwards in the liquid form. He finds that the sulphur compounds are increased, but that the yield of ammonia is but slightly diminished, even when abnormally high heats are used. As the paper consists largely of tabular matter it is difficult to convey an adequate idea of its contents in brief form, and it is well worthy the attentive study of all interested in the destructive distillation of coal.

Mr. Thomas Fletcher, of Warrington, has pointed out that the introduction of Brin's cheap oxygen has opened up a new field for the use of coal gas. With a small bottle of the compressed oxygen, which is falling in price, and a half-inch gas supply he was able to braze a joint on a 2-inch wrought iron pipe in about a minute. He also found no difficulty in welding small pieces of wrought iron, and has since designed and manufactured a special form of blowpipe suitable for use with coal gas and oxygen, and capable of fusing wrought iron with great facility. He believes that by the use of this apparatus wrought iron plates, such as boiler plates, could be welded together in position with far less trouble than would be necessary to braze an ordinary joint. Large boilers or brewing coppers could by this means be repaired in position without the trouble of removing. Another point that suggests itself is for use in joining wrought iron tubes. Under some circumstances it might be preferable to weld them together instead of screwing them up in the ordinary way. A faulty piece of service pipe might be cut and replaced without disturbing the other parts, with a great saving of labor, especially when the cutting of fresh screw threads is considered. The oxygen and coal gas apparatus might also replace the hydrogen apparatus used for joining sheet lead in the manufacture of sulphate apparatus with much advantage, and many useful applications will be found for it.

Several propositions have been made from time to time for the utilization of coal gas in connection with the ventilation of sewers. The foul gases must be discharged into the atmosphere in some form or another, and the idea is that before being allowed to escape they should be passed through a sort of closed gas stove, in which they would be raised to a temperature of 400° or so—sufficient to destroy all organic matter, disease germs, etc. Used in connection with an upright shaft, such an arrangement would also serve the purpose of creating a draught. A recent device of this kind is Keeling's apparatus, as improved by Mr. H. Holman, which is capable of being adapted to the pediment of an ordinary lamp pillar. It consists in effect of a Bunsen gas burner, with an arrangement of metal which may be termed a heating box or chamber. The sewer gases are admitted by a 6-inch pipe coming up from the sewer at the base. In ascending they come in contact with the flame of the gas burner, and pass into the heating chamber, where they are mixed with the products of combustion, and also raised to the required temperature. From this they escape into the holder case of the lamp post, and find their way into the atmosphere by means of apertures left for that purpose. It is said that in passing through the flame of the heating chamber all organic matter is entirely converted into carbonic acid and water, and any sulphuretted hydrogen, marsh gas, etc., that may be present is entirely burnt up and destroyed, so that the gases which escape into the atmosphere are in no way more obnoxious than those from an ordinary inhabited room.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

The New York *Sun* asserts that the striking coal miners have by their action put money in the treasuries of the metropolitan gas companies, because many boarding-house keepers have substituted gas stoves for the coal stoves formerly used in heating hall bedrooms, bathrooms, and the like, owing to the absence of connection between such apartments and the ordinary basement furnaces. Our contemporary then, somewhat sarcastically, but none the less truthfully, adds: "Space is so valuable on fashionable boarding-house streets that the average room is small enough to be made comfortable with a gas stove."

One of the latest enterprises with which the name of Mr. W. J. Winegar, who has already by his business tact contributed so much to the development of Florida's natural resources, is identified is that of the Tallahassee Gas and Electric Light Company. The Company is presided over by the Hon. E. S. Crill, and Mr. Wm. McIntosh is its Secretary. The capital is placed at $50,000. Like the prudent men they are, the gas plant will be put in at once, the electric installation to be attended to later on. In our correspondence columns will be found a letter from a resident, who instances the trouble occasioned to Mr. Flagler, at the latter's magnificent Ponce de Leon hotel in St. Augustine, because of the unreliability of the system of electric lighting employed to light the Ponce de Leon apartments. Another source of disquietude to the guests of this hotel is the dampness of its rooms. The artificial coquina, out of which the structure is composed, did not become thoroughly (that is, naturally) dried out before the guests were received, and much inconvenience was in consequence occasioned.

The Brooklyn (N. Y.) Board of Aldermen have awarded the public lighting contracts for current year, in accordance with the figures submitted by the various gas and electric companies, the figures handed in having been published in our mid-January issue. Fire Chief Nevins and his merry men accordingly continue to browse in the rich, red clover fields for another twelvemonth.

The Santa Cruz (Cal.) water works system has been purchased by a corporation, baptized the Santa Cruz Water Works Company.

The Orlando (Fla.) Gas Company has got far enough along to make public its charge for gas, which is $2.50. Large consumers are to obtain a rebate of 10 per cent.

The Hillsboro (Ills.) Gas and Electric Light Company has been incorporated by Messrs. W. C. Miller, John J. McLean, and W. A. Howett. This place is the capital of Montgomery county, Ills., and is on the Indianapolis and St. Louis Railroad, at a point 11 miles east of Litchfield, Ills., St. Louis, Mo., being 67 miles from it on the southwest.

Huntsville (Ala.) Happenings.—Messrs. Coxe and Murdock have much to congratulate themselves over in the management of the affairs of the Huntsville Gas Light Company, which is not called upon to supply the needs of an overpopulous (about 6,000 souls) place. One thing that enables the Company to sell gas at such decidedly fair figures (to ordinary consumers, $2 per M., and from that down to $1.60) is the rapid development which is taking place in the coal mining industry of the State. For instance, Huntsville is perhaps 110 miles by rail from the famous Pratt mines in Jefferson county, the coal product from some of these seams being an exceptionally valuable gas maker. Analyses of the Pratt seams, in Pratt mines proper, show the following: Fixed carbon, 65.54; sulphur, 0.47; ash, 2.08; and so on. It is also an excellent coker. Possibly good gas coal does not cost the Huntsville folks over $1.70 per ton. Apart from this favoring circumstance, the other conditions affecting Huntsville's gas supply are far from reassuring, the one great obstacle to rapid advancement being the blight occasioned by the ultra-freedom enjoyed by the negroes, who will not resort to manual labor unless hunger drives them to it. Despite this uncertainty in the matter of obtaining laborers, President Coxe has managed to keep the holder up, and, better still, will soon be interviewing contractors on the subject of making extensive alterations to his plant this season. Regenerator firing is to be adopted, and the entire establishment, in fact, is to be completely overhauled. In his letter to us on the subject President Coxe asks the question, "Is this not enterprise and cheap light?" To it we must reply, "Both, beyond a doubt." Many good and careful Eastern investors are agreed in the opinion that the progress of Alabama in commercial prosperity is not to stop with the developments so far recorded as having taken place at Birmingham and Anniston.

Messrs. A. C. Dunham, W. H. Bulkeley, H. M. French, T. O. Enders, W. O. Burr, W. H. Goodrich, Leverett Brainerd, H. Roberts, and Atwood Collins have been re-elected to the Directorate of the Hartford (Conn.) Electric Light Company. The lamb and the lion—albeit this time the lamb is on the outside—are occupying mutual territory now in Hartford, the power establishment of the Electric Light Company, and the housing of it as well, being furnished—for a consideration—by the Hartford Gas Light Company.

Brother Hookey Still to the Fore.—The annual meeting of the Augusta (Ga.) Gas Light Company was presided over by the Hon. Geo. T. Barnes, and the stockholders softly smiled when the annual statements were read. Certain it is they had no cause for aught save congratulation during the recital of the Company's progress in 1887. Feeling thus, they wisely decided to recommit the management of their affairs in '88 to the hands of those who so skilfully manipulated the reins of power during the last twelvemonth. The list is appended: President, G. T. Barnes; Secretary, H. B. Adam; Supt., G. S. Hookey; Directors, G. T. Barnes, E. R. Schneider, T. G. Barrett, P. Walsh, and P. H. Langdon.

Who Can the Solvent Firm Be.—The Berlin *Union*, a paper published in the city of the Kaiser, in the interests of the German export and import trade, recently contained a notice to the effect that "A solvent firm in the United States of America wished to buy coal tar pitch in casks, and in large quantities." We thought there was a sufficiency of this article lying around loose at home that could be purchased at pretty low figures. Here, now, is a chance for some of our protectionist readers to inveigh against the pauper coal tar of Europe. Perhaps, however, they may deem the subject to be too pitchy for argument.

Webster City, Iowa, is to have a gas works. This place is the capital of Hamilton county, the Boone river guaranteeing a waterway—although not a particularly valuable one. Railway facilities are afforded by the Dubuque and Sioux City line. It is 20 miles east of Fort Dodge. Population, about 4,100.

Mr. John T. Ehlen, of Baltimore, Md., through S. T. Wallis, attorney, has filed a bill in the U. S. Circuit Court, Baltimore District, against the Monongahela Gas Coal Company and the Howard Coal and Coke Company, of West Va. Complainant, who is the owner of 2,304 shares of stock in the first-named incorporation, seeks to have a conveyance of the Monongahela Company's property, etc. (made to the other Company impleaded on or about March 10, 1886), set aside as void because of irregularity. He also asks for an accounting in respect of all coals mined since the date of the transfer.

Perhaps a Suit will Follow.—The Adrian (Mich.) City Council has authorized the lighting of that city by electricity for a period of 3 years. The contractors are to supply 60 arcs, to burn every night and all night, on the following basis: First year, $5,800; second, $6,200; third, $6,000. The city charter requires that expenses on account of government must be estimated and apportioned in September of each year, and as the lighting fund for '88 was, last September, fixed at $5,800, the variation in the contract figures is explained. The provisions for apportioning moneys for certain specified public purposes are so stringent that it is quite likely trouble will arise over the sums allotted for Adrian's public lighting in '89 and 90, unless no change occurs in either the *personnel* of the Council or the spirit which now animates the individual members thereof regarding the means to be employed in lighting the city.

Where is the Joker?—Senator Russell has introduced a bill in the New York Legislature which aims to authorize the Municipal Gas Company, of Albany, to extend its pipes to places within 10 miles of the Capitol of the Empire State. Thus it would seem that the "baby process" is in a sort of "pent up Utica" condition! The portion of humor concealed in the preceding sentence is rather finely drawn, we fear; but Mr. Fish will probably see the point.

Street Lighting, Atlanta, Ga.—Early last month the City Council of Atlanta opened bids for the public lighting. The Gate City Gas Light Company, through A. P. Stewart, offered to maintain the street lamps for $18.50 each per annum, the old Atlanta Company, through J. H. Mecaslin, agreeing to assume the duty at the rate of $18. Helmsman Mecaslin received the contract. Mr. J. G. Woodward, Chairman of Committee on Lamps and Gas, succeeded in passing a resolution calling for the placing of 59 additional electric lights. When these are in po-

sition Atlanta will have 100 arcs, the cost of the same being $10 each per month.

THE CONNELLY & CO. IRON SPONGE.—This standard purifying material still appeals favorably to the gas men. Since Jan. 1 shipments of it have been made to 21 separate gas companies, 8 of which are located in Ohio, 3 in New York, 3 in Wisconsin, 2 in Pennsylvania, and 1 each in Virginia, Kentucky, Georgia, Indiana and California. They also inform us that the Board of Public Works, Phila., Pa., has authorized them to supply 22,000 bushels (more or less the contract reads) of their sponge during current year, deliverable in quantities to suit at the various stations of the Philadelphia gas works.

MR. GEO. M. ROSSMAN took charge of the Keene (N. H.) Gas Light Company on the first inst. His official title is that of General Manager.

CHEAPER GAS FOR JAMAICA PLAIN, MASS.—President Pratt has brought his pruning knife into play once more on the Jamaica Plain gas rate. Hereafter the net rate is to be $2 per thousand cubic feet. The Pratt knife seems to have a well turned edge.

CONTRACTORS should bear in mind the fact that the Plymouth (Mass.) Gas Company will make extensive plant improvements this season.

HARTFORD (CONN.) PUBLIC LIGHTING.—From the annual report of the Hartford Street Board it appears that during 1887, on an average, 675 gas lamps were kept in duty, the same having cost $17,753.09. On an average 127 No. 1 arc lights were employed, the total cost thereof having been $18,433.55, or an average of $145.15 per light. This seems to be a reduction of 10½ per cent from the average arc lamp cost of a twelvemonth ago. The average observer, however, will be apt to declare that the quality of the Hartford electric service kept pace with the decrease in cost. Possibly the decline in quality even outspeeded the decrease in cost.

THE Belleville (Ills.) Gas Light Company will put down about 3½ miles of pipe this season.

THE Laclede Gas Light Company, St. Louis, Mo., has purchased a tract of land on Evans avenue near Sarah street, whereon it will at once commence the erection of a relief holder (660,000 cu. ft. capacity) for the West End division.

THE Gainesville (Fla.) denizens are boasting loudly over the quality of the castings (home made, and by W. H. Roberts) now being supplied to the proprietors of the gas works in process of construction at Gainesville. Perhaps the denizens are right, but the aforesaid castings will have to be pretty slick to equal those turned out by manufacturers outside the orange belt.

ANNUAL MEETING, PORTSMOUTH, N. H.—At the annual Meeting of the Portsmouth Gas Light Company the following Board of Directors was chosen: Jno. Sise, J. J. Pickering, W. W. Cotton, J. W. Pierce and H. W. Jackson. They, in turn, selected the following officers: President, John Sise; Clerk and Treas., F. J. Philbrick. A dividend of 2½ per cent. was declared, payment of same to commence next Monday.

APPOINTED TO TAKE CHARGE AT MICHIGAN CITY, IND.—Henry H. Hyde, son of G. A. Hyde, Sr., was recently appointed Superintendent of the gas works at Michigan City, Ind. The appointee entered upon his new duties on Feb. 16, last. During the past four years he has been associated with his brother, G. A. Hyde, Jr., Engineer and Supt. of the works at East Saginaw, Mich. "Our sons their fathers' fading footsteps see."

LIGHTING AGITATION, MT. VERNON, OHIO.—A minority of the committee appointed to consider the question of lighting Mt. Vernon by electricity will report to the Council protesting against the purchase by the city of an electric lighting plant. The majority of the committee report that 100 electric lamps can be operated an hour longer each evening than is now the rule with the gas lights, and also at a less cost. The city now pays $5,500 a year for gas lighting, and those posted in the matter, and careless as to whether gas or electricity is to be the future lighting agent employed, assert that Mt. Vernon cannot be illuminated even halfway by electricity without an annual expenditure of $8,500. The electric clique in the Council make no secret of their intention to carry their point, no matter from what quarter or from whom the protests come.

THE five-year contract now possessed by Michael Ehret, Jr., which went into force July 1st, 1883, and under which he takes all the tar produced on the Philadelphia works, will soon expire by limitation. The present presumption is that Director Wagner will advertise for proposals, and in case the figures submitted are unsatisfactory the city may take control of the business. It is not likely the figures will be satisfactory, for the existing "tar trust," if we may be permitted to use the term, per the arrangement entered into under the charter granted about two years ago to a certain New Jersey chemical company, guarantees exclusive right in the Philadelphia "tar district" to the present holder of the contract.

PROF. W. E. A. AIKEN, of Baltimore, Md., in very courteous manner, takes exception to a paragraph in our last issue headed "Baltimore Lighting Hints." The paragraph was devoted to a *resume* of the lighting statistics of Baltimore, as contained in the Mayor's message, the figures, together with some reference to the work of the local official oil inspector, of course, having related to the year '87. It was stated by us that in the year under review 91 accidents—a considerable percentage of which entailed either fatal or serious injuries to persons involved in them—from oil lamp explosions had taken place. The fact is this terrible showing should have been charged to the year 1878, or about two years prior to the passage of an ordinance making the local oil purveyors subject to a compulsory official test of the goods offered by them for sale. The wisdom of this measure has been amply proved by the records of later years. For instance, in 1879 46 accidents from exploding lamps caused 26 deaths—in this year the ordinance was passed; in '80 there were but two fatal accidents; in '84 but one death occurred; no deaths in '86—out of 5,851 samples of oil inspected but 21 were condemned; while in '87 inspections numbering 6,204 were had without the detection of a single underproof sample. These statistics speak most eloquently and emphasize the necessity for like ordinances in even every hamlet of the country. Beyond a doubt, Prof. Aiken is entitled to receive that credit which his thoroughness demands, and we cheerfully make straight the ravel inadvertently occasioned in our prior mention of the matter.

THE Massachusetts Gas Commission has authorized the New Bedford Gas Light Company to engage in the electric lighting business, with the understanding that the minimum capacity of the initial plant shall be 160 arc lights, nominal 2,000-candle power. Then we have it on good authority that the Company will issue $75,000 of new stock, the same to be applied to the purchase of the franchise and plant of the New Bedford Electric Lighting Company.

WE understand that Messrs. Julius Lewis, R. F. Hoke, E. R. Stamps, V. C. Royster and others have incorporated the Peoples Gas Company, and propose to put up a plant in Raleigh, N. C. The capital stock is placed at $30,000. Is it not a wonder that Raleigh will not be taught a lesson for the future from the leaves of the past? The old Company has treated her people fairly, and would like to continue on in the habit; but now it is proposed to open the way to competition, with the inevitable result of subsequent combination. Perhaps Raleigh's city fathers are on the lookout for the golden argument that is supposed to accompany a "combine."

MR. TOWNSEND has introduced a bill in the Ohio Senate to grant to gas companies of that State the right to operate electric lighting plants.

SECRETARY PRICHARD, of the Ironton (O.) Company, writes that a New York party—a Mr. Dunham—has just obtained a franchise to operate an electric street railroad in that city, the grantee, however, having an eye also to the possibility of dividing the street lighting with the Ironton Gas Company. Further on Mr. Prichard says: "I do not worry about it, for I would rather have 50 gas cooking stoves than the 150 public lamps. Street lamps are sources of a very large proportion of the leakage account of a gas works. I wonder that some of our neighbors make such desperate fights to retain them. The enemies so made will not be compensated for by all they gain. I am a 'peace' man, with peculiar notions about making friends of your consumers, instead of enemies, and have always fought the idea of running after a City Council. You can generally gain more by letting them run after you, and keeping a stiff upper lip. * * * The city expects to submit to the voters, at the April election, the question whether they shall buy a plant and operate it themselves or not. Now, $40,000 for a schoolhouse and $20,000 for an electric light plant, besides several heavy new street levies, coupled with a $71,000 fire a few weeks ago, are pretty good doses for one year—and an off year at that." It would seem so, Bro. Prichard.

A LINE FROM CANTON, OHIO.—Mr. Jos. Bate, Supt. of the Canton (Ohio) Gas and Coke Company, has been very successful in his method of conducting operations at the place named; but this was to be expected

of one who, while fairly conservative, is ever alert to adopt that which has been proved sound by trial in the crucible of experience. Perhaps the following statement of the progress made in bettering Canton's gas supply will best illustrate the peculiarities of Mr. Bate's management. Less than a year ago the Canton plant and franchises were added, by means of open and honorable purchase, to the list of such enterprises under the control of the American Gas Company, of Philadelphia, Pa., and the proprietors of that undertaking have no cause for regret in the premises. On taking possession (April 1, 1887) the new owners found a selling rate of $2 per thousand in force, but they at once cut the price to $1.50. This move was followed by large extensions to the main system, the old pipes being also thoroughly overhauled. A sensible plan of plant betterment was perfected, one considerable item therein having been the placing of two new benches of sixes. These improvements were shortly followed by another concession in gas rates, the discounts granted causing gas to be sold in Canton at a net average of $1.35 per M. The year just closed was a most prosperous one, and plans are now under consideration, and likely to be adopted, which will put the Company in position to easily supply a daily demand of one-quarter million cubic feet. Canton is a good specimen of those towns in the West whose prosperity needs no booming to insure its continuance. Statistics show that the business of the place has easily doubled within the last 5 years, which is not very wonderful when it is understood that it contains at least twice as many permanent residents as it did in 1883. Keep abreast of the growth, Bro. Bate.

Changes at Springfield, Ohio.—Mr. Ed. C. Gwyn, formerly office manager and Asst. Supt. of Works, Springfield Gas Light Company, is now Secy. and Treas. of the Hoppes Manufacturing Company, a local corporation doing a lucrative business. We are sorry to lose Mr. Gwyn from the ranks, but people will insist on climbing up the ladder. May he have the best of luck in his new field. Mr. J. W. R. Cline, not by any means a new comer in the service of the Springfield Gas Light Company—he has been connected with it for 14 years—assumes Mr. Gwyn's former duties. Of course, old reliable—Nathaniel Kinsman—still acts as the Company's Engineer and Supt.

The management of the Williamsburgh (N. Y.) Gas Light Company seems once in a while to be able to exhibit a trace of common sense in directing the affairs of that corporation. The selection of Mr. Steers to the Presidency was an instance of this; and actually we are now treated to a second illustration, which is supplied in the appointment of Chas. A. Cross to the Superintendency, vice the late Wm. F. Brown. Quite encouraging, this.

Mr. J. L. Hallett, of the Springfield (Mass.) Gas Light Company is indulging in a short journey through the South.

Mr. Albert Holton, who will be affectionately remembered by many of the older of the New England fraternity, died at his home in Bangor, on the 9th ult. Deceased, who was in the 80th year of his age, had served as President of the Bangor Gas Light Company for many years.

To complete our earlier reference to the New Bedford (Mass.) Gas Light Company, we may say it is Mr. Taber's intention to add an incandescent plant (probably of the Edison type) to the recently-secured Thomson-Houston arc installation. A new retort house (90 ft. by 35 ft. and 32 ft. in height) is to be erected on the Company's property on South Water street. Regenerator firing is to be provided for.

Seeking Information.—We will publish any letters received in reply to the questions asked in the appended letter: "Office Frankfort American Gas Company, Frankfort, Ind., Feb. 15, 1888.—To the Editor American Gas Light Journal: I would like to inquire through the medium of your valuable paper the cause of the production of naphthaline in gas works using a jet exhauster; whereas in works using a rotary exhauster naphthaline is seldom seen. Also, to have defined the life of iron sponge for purification. I am desirous to know whether it would be beneficial to keep a double quantity on hand, with the idea of allowing one portion to rest while the other half is in use. Yours, etc., J. W. Larned, Supt."

A Satisfactory Season.—Mr. D. T. Roots, Vice-President of the P. H. and F. M. Roots Company, Connersville. Ind., writing under date of 15th ult., says his folks have to report a very large business in the past year. Having doubled the capacity of the establishment, the Company can now fill orders within a reasonable time from their reception. A partial list of machines sent out last year is appended: Chattanooga (Tenn.) Gas Company, 1 exhauster and engine on same bed-plate, capacity per diem, 1,480,000 cubic feet, and a similar apparatus to the order of the South-Side (Ills.) Co., capacity, 650,000 per day. The Nashville (Tenn.) Gas Company took 2 exhausters, with engines on the combined plan, together with governors, gas valves, pipes, fittings, etc., complete, the capacity of each machine being 2,200,000 cubic feet in 24 hours. Single machines, all with engine on same bed-plate, went to gas companies in the places named: Birmingham, Ala., capacity, 1,000,000 cubic feet; Yonkers, N. Y., 1,480,000 cu. ft.; Lake, Ills., same as Yonkers; San Jose, Cal., 650,000 cubic feet; Hamilton, Ohio, 315,000 cubic feet; Columbus, Miss., 168,000 cubic feet; Talladega, Ala., 168,000 cubic feet; Vicksburg, Miss., 315,000 cubic feet; Owensboro, Ky., 650,000 cubic feet; Lawrence, Kas., 315,000 cubic feet; Montgomery, Ala., 2,000,000 cubic feet; old St. Louis, Mo., 6,000.000 cubic feet. Up to Feb. 15th the Company had agreed to supply the Washington (D. C.) Company with two machines (combined plan), capacity of each machine to be 3,500,000 cubic feet. The Washington folks have also ordered two large blowers, with engines attached, for their water gas system. The Cleveland (Ohio) Gas Company has contracted for the delivery of an exhauster rated to pass 3½ millions cu. ft. per day—Engineer Hyde evidently expects to make some more gas in consequence of that dollar rate. Perhaps the Messrs. Roots will have to put up another factory.

Flatbush (L. I.) is a queer place. Something like a twelvemonth ago Deacon Oberglock was caught stealing gas from the Lott-Bergen-Lefferts Gas Company, and now Road Commissioner Hesterburg says that the Gas Company has been taking pay for four street lamps on Vernon avenue which were not lighted this winter. The Hesterburg "yarn" is made out of whole cloth, whereas the Deacon was caught in the act. The Teutonic element in Flatbush seems to be of a decidedly disturbing nature.

Messrs. Asbury & Son, proprietors of the Greenville (S. C.) gas works, report that, on the evening of Feb. 19, the frame building in which the purifiers were located was destroyed by a fire caused through the inexcusable carelessness of a negro employe. The loss sustained is about $2,000. The works had to be shut down for about 10 days.

The contract to illuminate the streets of Fond du Lac by electricity for a period of 5 years has been awarded to President Jos. Andrews, of the local Gas Company.

The Pittsfield (N. H.) Gas Company has been organized, with a paid up capital of $15,000, by Messrs. C. Carpenter, Jno. A. Goss, H. A. Tuttle, G. E. Kent and others. Its officers are: President, C. Carpenter; Treasurer, Jno. A. Goss; Clerk, N. S. Drake. This place is on the Suncook river, 15 miles east of Concord.

The Decatur (Texas) Improvement Company has been chartered. The movers, among other things, propose to construct a gas works. Decatur is about 65 miles west-north-west of Dallas. It is not much of a place.

At the annual meeting of the stockholders of the Waltham (Mass.) Gas and Electric Light Company Messrs. N. Clark, J. R. Farnum, A. T. Lyman, W. Roberts, C. C. Bills, C. E. Gatchell, A. M. Goodale, M. H. Young and G. A. Stearns were elected Directors. Mr. Stearns was re-elected Clerk and Treasurer. The annual report stated that the Company's electric light plant had yielded a small profit over and above the expense of running it. The increase in gas sent out in '87 over '86 was four millions cubic feet.

Owing to the dangerous condition of the chimney of the Westfield (Mass.) Electric Light Company's buildings, the streets were, on a recent occasion, kept in darkness for two nights. The operators were afraid that the jar of the engines would topple the structure into the streets. The Westfield gas consumers experienced no trouble, of course.

Life, in its agony, shrieks:

"Oh, gas may escape and gas may burst,
And vanish in noise and flame,
But the meter's hand, in its quiet way,
Goes traveling onward day by day,
And gets there just the same."

Brampton (Ont.) Has a Gas Company.—Mr. J. B. Burns, formerly of Ontario, is now acting as manager of a gas company which recently commenced active business at Brampton. An electric lighting company had had exclusive possession of the artificial lighting field at this point, but the gas men promise to acquire the lion's share of the business in the near future. The gas mains (about 3 miles, at present) have been in action only since the first of the year, but Manager Burns reports that 30 meters have been installed, and that he has orders for 30 more. These 60 consumers were users of electricity. Brampton (which is the chief town of the Peel district, Ontario, being 21 miles northwest of Toronto) is a growing place, the population now numbering upwards of 5,000.

The Citizens Gas Light Company, of Quincy, Mass., is about to make a reduction of 33⅓ per cent. in its selling price, which means the institution of a $2 rate. Those conversant with the conditions there will at once admit that Supt. McNeil will have his hands full in the attempt to make both ends meet. He is not likely, however, to fail.

[OFFICIAL REPORT.]

Eighteenth Annual Meeting of the New England Association of Gas Engineers.

HELD AT THE PARKER HOUSE, BOSTON, MASS., FEB. 15 AND 16, 1888.

FIRST DAY—MORNING SESSION—FEB. 15.

The Eighteenth Annual Meeting of the New England Association of Gas Engineers was held in the Parker House, Boston, Mass., the members being called to order, at 10:30 A.M. of Feb. 15, by the President, Mr. Jno. P. Harbison, of Hartford, Conn. The Secretary, Mr. C. H. Nettleton, of Birmingham, Conn., recorded the proceedings.

ROLL CALL.

Members present:

Honorary Member.

Jos. R. Thomas, N. Y. City.

Active Members.

C. T. Frost, Rockland, Me.	H. B. Leach, Taunton, Mass.
A. H. Parker, Bangor, Me.	C. D. Lamson, Boston, Mass.
W. D. Cadwell, Nashua, N. H.	W. A. Learned, Newton, Mass.
A. F. Cooper, Exeter, N. H.	R. J. Long, Salem, Mass.
L. P. Gerould,* Manchester, N. H.	D. Moore, Salem, Mass.
J. M. Hill, Concord, N. H.	G. L. Manchester, E. Hamp'n, Mass.
A. M. Norton, Nashua, N. H.	G. B. Neal, Boston, Mass.
H. A. Norton, Nashua, N. H.	J. Porter, Greenfield, Mass.
C. F. Warren, Manchester, N. H.	C. F. Prichard, Lynn, Mass.
F. H. Parker, Burlington, Vt.	F. S. Richardson, N. Adams, Mass.
J. Andrew, Chelsea, Mass.	C. S. Spaulding, Brookline, Mass.
W. Anderson, Marlboro', Mass.	J. Q. A. Spear, Boston, Mass.
H. A. Allyn, Cambridge, Mass.	W. H. Snow, Holyoke, Mass.
J. H. Burnham, Boston, Mass.	C. F. Spaulding, Waltham, Mass.
D. Boynton, Chicopee, Mass.	W. Tarbell, Waltham, Mass.
F. C. Blood, Ware, Mass.	A. W. Tarbell, Waltham, Mass.
G. D. Cabot, Lawrence, Mass.	D. D. Tilton, Newburyport, Mass.
O. E. Cushing, Lowell, Mass.	J. R. Todd, Natick, Mass.
H. F. Coggshall, Fitchburg, Mass.	R. B. Taber, New Bedford, Mass.
D. W. Crafts Northampton, Mass.	L. W. Wells, Roxbury, Mass.
J. A. Coffin, Gloucester, Mass.	W. A. Wood, Boston, Mass.
A. M. Copp, Boston, Mass.	J. H. Armington,† Providence, R.I.
W. B. Durfee, Jr., Dorchest'r, Mass.	Z. M. Jenks, Woonsocket, R. I.
F. R. Davis, Athol, Mass.	S. G. Stiness, Pawtucket R. I.
M. S. Greenough, Boston, Mass.	W. A. Stedman, Newport, R. I.
J. L. Hallett, Springfield, Mass.	A. B. Slater, Providence, R. I.
E. Hassett, Beverly, Mass.	O. Gilmor, Norwich, Conn.
C. J. R. Humphreys, Lawrence, Mass.	J. P. Harbison, Hartford, Conn.
M. Jewett, Clinton, Mass.	E. C. Learned, New Britain, Conn.
C. M. Jewett, Clinton, Mass.	C. H. Nettleton, Birmingham, Conn.
E. C. Jones, Boston, Mass.	

* Present address, Nos. 5 and 7 Skillman street, Brooklyn, N. Y.
† Now President of Brooklyn (N. Y.) Gas Light Company.

APPLICATIONS FOR AND ELECTION TO MEMBERSHIP.

The following applications for membership were received: *Active Class.*—Malcolm Peters, Manager Gas Company, Brockton, Mass.; Walter G. Africa, Supt. Peoples Gas Co., Manchester, N. H.; J. H. Manchester, Treas. Gas Co., Bristol, R. I.; N. J. McNeil, Supt. Citizens Gas Co., Quincy, Mass.; H. S. Chase, Supt. Gas Co., Great Falls, N. H.; Ralph Woodward, Asst. Supt. Gas Co., Waltham, Mass.; A. K. Quinn, Treas. Gas Co., Newport, R. I.

Associate Class.—F. P. Fairbanks, Supt. Gas Works, Manchester, N. H.; C. C. Johnson, Secy. and Treas. Gas Co., Norwich, Conn.

The applicants were subsequently declared elected to membership in the Association.

ROUTINE BUSINESS.

On motion, the minutes of the last annual meeting were, without having been read, adopted as published in the official JOURNAL.

The President appointed Messrs. S. G. Stiness and H. B. Leach a committee to invite visiting members of the fraternity, who were not members of the Association, to seats in the Convention. The committee subsequently introduced the following gentlemen:

F. S. Benson.	F. J. Davis.	H. C. Leonard.	J. G. Salva.
W. R. Beal.	F. W. Floyd.	S. V. Merrick.	F. Seaverns.
J. S. Bush.	G. W. Graeff, Jr.	G. S. Page.	W. H. White.
F. E. Barker.	J. L. Howard.	I. N. Stanley.	C. H. Waldo.
C. H. Corbett.	G. F. Kreischer.	E. Stein.	O. H. Weber.
W. H. Down.	E. Lenz.	C. H. Sprague.	J. A. Waldo.

The Secretary here read letters of regret from those who (having received invitations to be present at the meeting) were unable to personally respond to the same.

An invitation from the Guild of Gas Managers, offering the use of their rooms to the members of the Association during their stay in Boston, was received and read. The invitation was accepted, and the Secretary was directed to return the thanks of the Association therefor.

TREASURER'S REPORT.

The following report from the Treasurer was read:

1887.	*Receipts.*		
Feb. 12.	Balance		$209 80
	Received from dues	$246 00	
	Received from admission fees, meeting '87	25 00	
			271 00
	Interest		29 43
	Total receipts		$510 23
1887.	*Expenditures.*		
Feb. 17.	Expenses of meeting, Feb., 1887		$114 70
	Postage, telegrams, etc		16 41
July 13.	R. B. Taber, expenses of experiments in photometry, as per vote of Association		50 00
1888.			
Feb. 10.	Salary of Secretary and Treasurer		50 00
	Balance		279 12
	Total expenditures		$510 23
	Permanent fund, deposited in Derby Savings Bank, of Birmingham, Conn		$700 00

BIRMINGHAM, CONN., Feb. 11, 1888.

CHAS. H. NETTLETON, Treas.

We hereby certify that we have examined the Treasurer's account, and find the same correct. C. F. PRICHARD, A. M. NORTON, } Auditing Committee.

On motion, the report was accepted, approved and placed on file.

The President—The Association will remember that Messrs. Taber and Prichard were appointed a committee to make some investigation in photometry, in the interest of the Association, and also voted the sum of $50 towards defraying the expenses of the investigation. They have made many experiments, and have presented a preliminary report, which will be read to-day; but the sum voted them has not covered their entire outlay. They have been paid, according to the Treasurer's report, $50, but they have expended about $40 more.

On motion of Mr. Wood the Treasurer was instructed to pay to Messrs. Taber and Prichard a sum not exceeding $40 in repayment of balance of their expenditures to date.

Mr. Taber—With regard to this extra expenditure of $40 I may state we found that the Pentane burner was valued at 10 pounds sterling in England; and the expense of getting it here, paying extra freight, custom house dues, etc., have compelled us to exceed the appropriation.

REPORT OF THE DIRECTORS.

The Secretary read the report of the Board of Directors:

The Board of Directors recommend the following for favorable action of the Association.

That the following named papers be read:

"Introduction of High Candle Power Burners," by H. A. Allyn.

"Walker Tar Extractor," by C. A. Gerdenier.

"A New Way of Utilizing Ammonia Liquor," by C. J. R. Humphreys.

Report on "Candle Power and Illumination," by Messrs. Prichard and Taber.

"A Vagary in Naphthaline" by W. H. Snow.

"The Running of a Small Gas Works," by J. R. Todd.

"Items from a Superintendent's Note Book," by W. A. Wood.

That the Association adopt a resolution that hereafter at least two directors be retired each year.

That the Articles of Association herewith presented be adopted.

That the salary of the Secretary and Treasurer be fixed at $100 per annum.

On motion of Mr. Stiness the report was accepted.

The President—We will now take up the recommendations made by the Directors and act upon them. The first is:

"That the Association adopt a resolution directing that hereafter at least two members shall be retired each year;" and they offer the following resolution:

"*Resolved*, that it is the sense of the Association that hereafter when a list of officers to be voted for is prepared, at least two of the Directors

who have served during the previous year shall be retired, and in their place the names of members who have not served as officers in the preceding year shall be substituted."

The object of this is to bring into the management of the affairs of the Association new elements, by having men in the Board of Directors who have not heretofore served in that position, in order that they may be put in working trim, trained in the harness, prepared to do their share of the work, and so become more closely identified with the interests of the Association. By adopting this plan there will be presented to the Association each year a list comprising three directors who have served in previous years, and two who have not so served.

Mr. Stiness—I move the passage of the resolution as read.

The President—It is moved that the resolution be passed. Are any further remarks to be offered upon the subject?

Mr. Stedman—I would like to state to the Association that the matter was fully considered in the Board of Directors last evening, and the suggestion made that as the whole board of direction consists of all the executive officers, together with this list of directors, really, when two members are retired but a very small minority of the whole board is left off, consequently there are always present in the new board a sufficient number to enable the incoming members to be educated in their duties by the older members. There is, therefore, not the slightest probability of ever getting a majority of new members in the board. The committee also approved the use of the phrase "at least two new members" so that the nominating committee would not be restricted to, or be under any obligation to report all of the old board with the exception of two new members. They might report three or four new members if they saw fit. It was thought best that the Association should express its sense of the desirability of that action on the part of the nominating committee when they went out, so that they should feel entirely free to retire two or more, if they saw fit, without feeling they were making any invidious discriminations between those who were retired and those who were left.

The resolution, as read, was approved.

The President—The next recommendation is that the articles of association, herewith presented as the report of the special committee appointed to prepare and present the revised articles of agreement, be adopted. Col. Stedman was chairman of that committee, and he will kindly read the articles as adopted by the committee and amended by the Directors.

Col. Stedman thereupon read the following:

PREAMBLE AND ARTICLES OF AGREEMENT OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

Preamble.

WHEREAS, The manufacture and supply of gas has become one of the largest economic interests in the country; and whereas, it is most important to the manufacturers and to the public that the best processes known shall be employed in its manufacture and distribution, and, whereas, it is most desirable to obtain the advantage of the experience of the Gas Engineers scattered throughout New England upon the various problems presented for consideration, we, the undersigned, hereby agree to associate ourselves for the above-named purpose, according to the following

Articles of Agreement.

1. The association shall be called "The New England Association of Gas Engineers."

2. The annual meetings of the association shall be held in the city of Boston, Mass., unless otherwise ordered by the association, on the third Wednesday of February in each year, at such hour and place as the directors shall determine.

3. The officers of the association shall be a President, two Vice-Presidents, a Secretary and Treasurer, who, with five other members of the association elected for the purpose at an annual meeting, shall constitute a Board of Directors. Their terms of office shall continue till the close of the meeting at which their successors are elected.

4. Any New England Gas Engineer may become an active member upon application to the Secretary accompanied by the endorsement of two active members of the association and by the membership fee of five dollars, the approval of the Board of Directors and an election by three-quarters of the votes at any regular meeting of the association, and by signing an agreement to pay such assessments as may be levied by the Board of Directors. Any Gas Engineer residing out of the New England States may be elected an honorary member by the same vote as is required for the regular election of members of the association. Any person residing in New England and connected with industries pertaining to the gas business may become an associate member upon conditions prescribed for active members. None but active members shall vote or be eligible to office.

5. The administration of its affairs shall be intrusted to the officers of the association, of whom four shall form a quorum for the transaction of business.

6. The Secretary and Treasurer shall receive all moneys; he shall also notify all meetings, taking minutes of the proceedings at all meetings of the association, and enter them in proper books provided for the purpose. He shall write the correspondence, read minutes and notices at all the meetings, and also papers and communications, if the authors wish it; report discussions, and perform whatever duties may be indicated in the regulations of the association as appertaining to his department.

7. At any regular meeting of the association ten members shall be a quorum for the transaction of business.

8. All questions shall be decided by any convenient system of open voting; the chairman to have a second or casting vote when necessary. Questions of a personal nature shall be decided by ballot.

9. All papers proposed to be read at a meeting of the association must relate to matters directly or indirectly connected with the manufacture and distribution of gas, and must be approved by the Board of Directors before being read at such meeting.

10. All papers, drawings, or models, submitted to theses meetings shall remain the property of the authors.

11. If any person proposed for membership, on being balloted for, shall be rejected, no notice shall be taken of the proposal in the minutes.

12. The annual assessment shall be payable in advance, at or before each general meeting; and no member whose assessment is in arrears shall be entitled to vote. If any member shall neglect to pay his assessment for the space of two years, he shall cease to be a member of the association.

13. These articles may be altered or amended at any annual meeting, notice of such proposed change having been given to the Secretary at least thirty days previous to such meeting, and by him communicated to all members at least one fortnight previous to such meeting.

The President—The question now is upon the adoption of the articles of agreement as read by Col. Stedman.

The articles of agreement, as read, were then unanimously adopted.

The President—The next recommendation of the Directors is, "That the salary of the Secretary and Treasurer be fixed at $100 per annum." This recommendation meets the unanimous approval of the Board of Directors. [Recommendation approved.]

PRESIDENT'S ADDRESS.

The President now read his annual address:

Gentlemen of the New England Association:—Another year—with its record of duties performed, difficulties met with on the way and, I trust, overcome, results attained, dividends earned and paid to our shareholders—since last we met at these our annual conventions, has passed into history.

How does the record read? I have no doubt but that in each individual case it would show duty well and conscientiously performed, and results obtained entirely satisfactory.

We have on our roll of membership the names of 5 honorary and 93 active members.

The report of the Treasurer will show that the receipts for the year have been $300.43 and that the expenses for the year have been $231.11, leaving a balance on hand, and safely on deposit in savings banks, the sum of $979.12.

At the last annual meeting a committee was appointed to consider and report on a proposed amendment to the Constitution or Articles of Agreement of the Association, providing for the admission of associate members, and were empowered to consider and recommend such other amendments as might be deemed advisable. The committee have attended to the duty assigned to them, and their recommendations will be laid before you for your consideration and action. I would heartily recommend that their report be adopted.

The past year has not been productive of anything new or of special importance in our profession or calling, but rather of steady progress in our well-trodden path, each one aiming to secure better results and greater economy in the process of manufacture, purification and distribution of the gas, a more profitable market for the residuals, and also, in various ways, to open up and encourage new and heretofore unoccupied fields, in which to dispose of his gas and residuals and increase the volume of business. I trust each individual case has met with gratifying and deserved success.

Different styles of apparatus, some of them heretofore untried in this

country, have been introduced for removing the tar and carbonic acid from the gas—notably the so-called "Walker tar extractor."

In regard to its introduction by the Bridgeport, Conn., Gas Company, and results obtained by them in its use in that city, a valuable paper has been, by special request, prepared, and will be read to you by Mr. C. A. Gerdenier, the able Superintendent of that company.

Continually increased attention has been given to the more successful and efficient removal of ammonia from the gas. This has been encouraged by an increased demand for the ammonia obtained. The demand for coal tar has not varied greatly from that of previous years.

Resulting from the "strike" in the anthracite coal regions and other causes, coal for domestic purposes has been advanced in price. Many of us have thus been able to increase our daily output of gas by its use as an economical and convenient substitute for coal, and has also caused a demand for coke in places where it had not heretofore been used. This has not only enabled us to market our coke in the present winter, but has brought us a new class of customers, many of whom will be *permanent* ones, thus helping us in years to come.

At a meeting of your Board of Directors, held a few weeks since, a committee of the Board was appointed to arrange, if possible, for the delivery of a lecture before the Association, at this meeting, on some *practical* subject pertaining to the manufacture of gas, by some gentleman of recognized professional scientific attainments. I regret to say, however, that owing to the limited time between the appointment of such committee and the date for this meeting, they have been unable to consummate the desired arrangement. I would earnestly recommend that your committee to report list of officers for the ensuing year, when appointed, be requested to report a committee of three, selected from the list of officers whom they may recommend, which committee, if elected, may be charged with the duty of securing the services of some scientific gentleman to prepare and deliver a lecture at the next annual meeting, on such day and on such subject as may be agreed upon by such committee and such lecturer. And I would further recommend that such an addition to our meetings be made a permanent one.

The introduction and use of regenerative and other styles of improved furnaces made progress during the year, and they continue to give satisfaction in economy of labor and fuel.

Quite a number of the gas companies of New England have made reductions in the selling price of their gas during the year. The managers all seem earnestly at work to reach the "one dollar" limit. Who will be the first one here in New England to make the announcement? May the conundrum soon be solved.

Following up the suggestions of a year ago, together with facts derived from the admirable paper then presented to the Association, by Mr. F. S. Richardson, of North Adams, Mass., on the subject of "High Candle Power Burners," and the valuable and interesting discussion of that paper, it is gratifying to note the great progress that has been made during the year in their introduction in many towns in New England; and, so far as we can learn, with satisfactory results. Your attention will be especially called to this subject during this meeting by a paper prepared by Mr. H. A. Allyn.

A very gratifying response has been made by members of the Association to the somewhat urgent and persistent request of our worthy Secretary for papers to be read at this meeting. Quite a number will be presented for your consideration, and I know they will have, as they so well deserve, your earnest attention and careful consideration.

A subject which I deem of special importance to every member of the Association is, "How best to develop the large field which is at our doors for the use of gas for domestic purposes." The gas stoves now on the market are about all that can be desired, as to quality of material and workmanship, and most of them do their work in an admirable manner; but the cost of the stoves is, in my opinion, largely in excess of what they can be produced for, and yet pay a fair profit to the manufacturer. This fact greatly retards their introduction and general use.

Some concerted action should be taken by the members of this Association in regard to this important matter. I understand that proposed action in this regard is being seriously and earnestly considered by members of other associations, the benefits of which we hope to realize at an early day.

The subject of electric light continues to be an interesting one. The past year has witnessed considerable progress made in the introduction of the light, mostly of the incandescent type; but I have yet to learn of any advance in the reduction of the cost of production of the light—or in correct business methods of introducing it. The business is now, as in the past, conducted in a sort of "go as you please" style. What was the amount of your gas bill last year? We will furnish you with the electric light for the same amount; you may use all you wish, and no charge will be made for introducing or lamps. They too frequently succeed in obtaining customers, as might be expected, in that way. Later on, we may be able to obtain some reliable information as to the profits made in doing that kind of business.

It grieves me much to be compelled to relate that a former associate and friend, the late David Brayton, of Brockton, Mass., has passed out of this life. To other hands than mine, in accordance with your well established usage, will be committed the mournful task of preparing a suitable minute to his memory for inscription on the records of our Society. Some others of our members have suffered greatly during the twelvemonth, and their genial faces and kindly greetings will be sadly missed at our annual reunion; but we are permitted and encouraged to hope that a kind Providence may speedily grant them that restored health and strength necessary to enable them to perform their duties with all the vigor and earnestness so characteristic of them in former years.

Appointment of Special Committees.

On the motion of Mr. Stiness, the address of the President was referred to a committee consisting of Messrs. S. G. Stiness, W. A. Wood and Ogden Gilmor.

Mr. Jones moved the appointment of a committee of three to nominate a list of officers to serve during the ensuing year. The President appointed as such committee, Messrs. E. C. Jones, A. B. Slater and J. L. Hallett.

Mr. Neal—Before the committee retires I wish to ask that my name be omitted from the list of proposed officers. I have held office ever since the formation of the association—14 years as Treasurer and Secretary, and 3 years as Director. I now ask that my name be left off the list.

The President—The committee hear the request of Mr. Neal; and they will remember the expressed wish of the Association that at least two members of the board of direction be dropped from the list that served last year, and new names be submitted. The next in order is general business. Has any member any business to bring forward before we proceed to read and consider the papers?

Mr. Lamson—I think we over-looked one matter in the President's address. He suggested the committee to be appointed to nominate officers should also consider the question of the expediency of making an arrangement for a lecture next year.

The President—The address was referred to a special committee, and they will report on the advisability of taking any action on that subject. The committee appointed to name a list of officers will probably withhold their report until we have heard from the committee with reference to that recommendation. Since all pressing routine business appears to have been disposed of, we will proceed to consider the papers.

Reading of Papers.

Mr. H. A. Allyn, of Cambridge, Mass., thereupon read his paper, entitled

THE INTRODUCTION OF HIGH CANDLE POWER BURNERS.

When your Secretary, a few days since, requested me to write a paper on the Lungren lamp, my first inclination was to refuse. It appeared to me that the subject had been about exhausted by Mr. Richardson in the very able paper* which he read at our last meeting, and again by the paper† of Mr. T. A. Cosgrove, read at the meeting of the Western Association. But in reading those papers again, it seemed to me that both gentlemen had given us all the virtues of the lamp, extolling all its good points, but making no mention of its faults and defects. Now it has seemed to me that in the papers, which are read before this Association, and in the discussions which follow, the utmost freedom ought to prevail; and whether the subject under discussion be a regenerative furnace or a regenerative lamp, whether the appliance is of home or foreign extraction, we should have the bottom facts, that we may see not the bright side alone but the dark side also. If obstacles are to be met they should be pointed out that we may be prepared to surmount them, and with this idea in view I propose to give you a year's experience in the use of the Lungren lamp. The object we had in mind in persuading our consumers to adopt the Lungren lamp was simply this. Two electric companies had sprung up in our midst—one in Cambridge, the other in our Somerville district. We looked the field over for the most effective weapon to meet the attacks of these newcomers, and came to the conclusion that, all things considered, the Lungren lamp was the best adapted to our purpose. The next question which presented itself was what method to adopt in introducing them. We of course, preferred to

*See JOURNAL, March 2, '87, p. 143.
†See JOURNAL, August 2, '87, p. 68.

sell them at once to the consumer; but the consumer did not take kindly to this proposition, so we suggested another—viz., to lease them to the consumer at $5.00 per year, and keep them in working order. This plan seemed to strike them more favorably, and the results for the year are that we have leased eleven 8-ft., ninety-eight 12-ft., and sixty-two 16-ft. lamps, or a total of 171 lamps. These have been placed about as follows:

Billiard saloons	18	lamps.
Dry goods stores	24	"
Druggists	20	"
Groceries	14	"
Picture stores	4	"
Provision stores	15	"
Fruit stores	4	"
Shoe stores	10	"
Tailor shops	11	"
Clubs	5	"
Residences	3	"
Livery stables	11	"
City and other halls	11	"
Miscellaneous	21	"

My impression, after having the lamp in use for perhaps two months, was that we had at last found the *ne plus ultra* and the *multum in parvo* of all gas burners. The lamp did not appear to have an "out" about it. It seemed, in fact, as if you had only to light it up, when like Tennyson's brook, it would "go on forever." But a little later some of the "outs" began to appear. We found that where the lamps were extinguished every night the white-coated surfaces soon became discolo ed and the enamel cleaved off. On the other hand, when we could persuade our consumer to turn the light down to a glimmer, and, in place of shutting off the gas, allow the lamp to burn continuously, we had very little annoyance from this cause, and the enamel remained intact for a long time. But very few of the consumers however, could be convinced that this plan was anything but a trick of the Gas Company to compel them to burn gas the whole twenty four hours.

As soon as this trouble developed itself we sent to the manufacturers (through their agents) for the formula for recoating the enamelled surfaces. We received a lengthy "bill of particulars," but, though we followed the instructions to the letter, we found that the results were anything but satisfactory. After our patience was about exhausted the manufacturers concluded to supply us with the coating material; and one of the defects of the lamp had been partially overcome. We soon found that we had another, and a more formidable, evil to contend with. The intense heat generated by the burner very soon destroys any lubricant that may have been in the stop cock, and renders it so rigid that it is a very difficult matter to turn the gas on and off. In fact many of the chains were broken in trying to operate the lever cock.

The manufacturers of the lamp evidently discovered this defect about as soon as we did, as we were informed that a new cock had been made, with a long double lever, and that said cocks would be exchanged for those that had proved inefficient. This proposal reminded me of the tale in the "Arabian Nights," where new lamps were offered in exchange for old ones. While we were wondering at the unexpected generosity of the Company, we received another announcement that the new cocks would be furnished on receipt of the two old ones and forty-five cents additional! We had laughed to soon.

After we had purchased about thirty lamps we noticed that the method of constructing the flame plates was changed. Now the uninitiated in such matters might have thought, as the first flame plates had proved defective, that the manufacturers ought to furnish the new pattern gratis; and that it would be a good card for them to do so. But somehow we do not see these matters in the same light so we were obliged to pay for the duplicate flame plates.

I have now given you some of the obstacles we have met in the introduction of the Lungren lamp. As I have before intimated, however, the principal source of annoyance has been the difficulty in keeping the lever cocks in working order, almost daily complaints of this trouble being received; but I think the substitution of the long lever will nearly overcome this difficulty.

Now, having recounted some of the annoyances attending the introduction of the lamp, it is but just that I should commend its good points.

When we consider how radically different in principle the Lungren lamp is from any appliance that had been heretofore in use, it is wonderful what general satisfaction it has given to the consumer. Of the whole number of lamps that we have put in operation only the following have been removed: 1, from a drug store; cause, low ceiling; too much heat; put in contrary to our advice. 2, bread store; removed for same cause. 3, drug store; substituted by arc light, which in turn has been ordered out during the past week and the Lungren lamp ordered back again. 4, gent's furnishing store; taken on trial in place of arc light, but rejected.

After about a dozen or so had been leased we made no further effort to introduce the lamp, but let it advertise itself. A consumer seeing the lamp in his neighbor's store, would make inquiries where it came from, the price of the lamp and cost of running it, and conclude by sending us an order for a trial lamp, which has generally been followed, in a few days, by orders for more.

As an illustration of the general satisfaction that has resulted from the use of the lamp, I will briefly state two cases. Among the first to adopt the lamp were the proprietors of a pool and billiard saloon. The hall was lighted by gas burners over each table, and by nine large oil lamps on brackets; but the combined light was insufficient. I hung a 12-foot lamp over each table (six in number) and a 16-foot lamp over the cigar counters. As soon as the Lungren lamps were put up the oil lamps were taken down, thereby effecting a saving of $5 per month for oil alone, without taking into account the items of care, wicks, and broken chimneys. The gas bills for the year prior to the introduction of the new lamp had been $201.80. The gas bills for the past year have been $184.20; showing a total saving of $17.60 for gas and $60 for oil, while the proprietors report that their receipts have increased $5 per day during the year, which is, of course, attributable solely to the improved method of lighting.

In the other case the keeper of a livery stable had a 16-foot lamp in use for several months, when the old building was torn down and a fine brick stable erected in its place. The owner had been so well pleased with the lamp that, on the completion of his new establishment, he gave us an order for 10 lamps.

In conclusion, the general results of the introduction of the lamp have been that our electric friends have only succeeded in securing a few of our consumers. Some half dozen parties have discarded kerosene and become consumers of gas, in order that they might enjoy the brilliant light of the Lungren lamp, thereby increasing our sales. The price of the lamp at first seemed excessive, but a liberal reduction has recently been made.

Perhaps a word or two of counsel and advice may not be without good results to those who may venture into this field. First, let me say, however, that while I desire to say nothing that may prove prejudicial to the lamp, I warn those who have not used it that if they labor under the impression that their work is completed when the lamp is placed in position, they will surely find that they have been mistaken. We have yet to meet the consumer who will take the trouble to keep the globes and burners in a cleanly condition, without which the lamp will not perform its maximum work.

The mistake we made at the start was in thinking that many might prefer to purchase rather than lease. We gave them the choice, and, with only two exceptions, they preferred to lease the lamp rather than purchase it. My advice to those about to introduce the lamp would be to place a few on exhibition at prominent points. They will at once attract attention, and when inquiries are made offer the lamp at cost, making no charge for hanging. I firmly believe if we had adopted this plan at the start we could have sold nearly as many lamps as we have leased, and we should have about $5,000 in our treasury, instead of having it invested, as it now is, in a stock which may prove "unreliable assets," if some lamp simpler, cheaper or better enters the field.

Discussion.

The President—We have heard a very interesting paper on a very important subject. I trust the merits of the paper, and of the lamp as well, will be thoroughly discussed. I know from reports that Mr. Leach has had a very large experience with these lamps. We would like to hear from him.

Mr. Leach—We have nearly 100 of these lamps in the city of Taunton, Mass. Our experience has not been quite so unpleasant as that of Mr. Allyn's. We rent the burners. Those using them do not, fortunately for us, find any fault with their gas bills. In fact one or two have told me that their bills are smaller than they were before. We have one machine and boiler shop lighted up with them, where formerly kerosene was burned. The owners said that they would burn gas if we would furnish the Lungren lamps; and we did so. They have 28 lamps, and like them very much indeed. They say they not only like the light, but that it adds to the comfort of the employees. They say the heat from them is very agreeable. We have one clothing store that was formerly lighted by an arc light, but the proprietors thought they could light it cheaper and more satisfactorily by the Lungren lamp. The treasurer of

the arc company tried to get them out of the notion by talking to them of the excessive heat which the Lungren lamp would give out; but the clothier remarked that that was just what he wanted. By its use he said he could save five or six tons of coal in the winter season, and in the summer season his customers would come in and remark, while wiping the perspiration from their brows, "It is fearfully hot; I must have some thin clothing." We have had considerable trouble by reason of the cocks heating up and stopping, but since using the long lever cock we have had no trouble whatever. I think it is very much better to let the lamp burn all the time, turned down low, so that a blue flame only is shown when not in use. We have had no trouble with the flame plates. As far as selling them is concerned, I may say we tried the experiment, but the result was not satisfactory. I offered the lamps at $5 less than cost, but was told they would not buy them. They can be rented readily. We rent them for 25 cents per month, or $3 per year.

Mr. Neal—What does the Lungren lamp consume in 24 hours, when turned down low—a 16-ft. lamp for instance?

Mr. Allyn—I have never ascertained that. That matter was discussed at the last meeting, when Mr. Richardson stated he had not found a meter that would accurately record it, the amount was so small.

Mr. Leach—I will say I have tried to determine it, at the office. I find that a 16-ft. lamp consumes four feet during the night—*i. e.*, from six o'clock at night to seven the next morning. I have heard others say it consumed more.

Mr. Taber—We tested it in New Bedford, and found that one foot per hour, when turned down low, would be an ample allowance.

The President—Would it be safe to reduce the consumption to very much less than one foot per hour during the night?

Mr. Taber—I do not think it would be. I have known of instances where the light has gone out when turned too low.

Mr. Jenks—I would like to say a word about that small light allowed to burn all night. I agree with the statement that one foot an hour is about as small a rate of consumption as can be safely left. We determined, by means of an experimental meter, that any less amount was unsafe, because the light was likely to go out. I would like further to say, with regard to the sticking of the stopcocks, that we have adopted the method of putting cylinder oil onto the plugs, and have had very little trouble since that time. We use a very high grade cylinder oil, and although we have to attend to them more than we formerly did, still it has removed the difficulty to a great extent. We have now about 75 lamps in Woonsocket, and rent them at $3.65 per year.

Mr. Taber—Has any member tried ordinary black lead, or plumbago, for lubricating? The man who has charge of our lamps told me a week ago that he was putting it on every one, and thought it was a great success.

The President—As Mr. Learned has had a large experience in the use of this lamp, we would like to hear from him.

Mr. W. A. Learned—A year ago last June we went into the Lungren lamp business. In two months we put in 45 lamps, and rented them at the rate of $5 per year. Last October we had two Lungren lamps taken out, and in their place 20 and 30-candle power incandescent lamps were substituted. We then reduced the rent from $5 to $2.50 a year, and were able to put back the two lamps and introduce a number of new ones. My experience is about the same as that of the rest of the gentlemen with regard to the lamp itself.

The President—Then your recommendation would be that parties trying to introduce them should not put their rental too high. Starting out with a low rental you think would be more likely to put the lamps in permanently?

Mr. Learned—Yes.

Mr. Anderson—I would like to ask if any members using the Lungren lamps have had any trouble because of their discoloring the ceilings?

Mr. Porter—I have had trouble in one case, which was caused by the governor getting out of order, whereupon the lamp smoked.

Mr. Allyn—We have had only one case of that sort, which happened in the billiard and pool room referred to in my paper. This place is patronized almost exclusively by the students of Harvard College, and when the lamps were first put in they gave a brilliant illumination, and produced fine lighting effects, but the attendant, not satisfied with the original success, thought he would improve them a little, and started up some of the governors in an attempt to burn a larger flame than could be produced with perfect combustion. In consequence the ceiling of the room became somewhat discolored. We think this is the only place where there was any complaint from that cause.

Mr. Taber—In every case where discoloration was produced were the lamps kept burning all the time?

The President—Will the gentleman who had trouble from the discoloration of the ceiling answer the question?

Mr. Porter—No; it was altogether owing to the governor getting out of order.

Mr. Anderson—I desire to call attention to the discolaration of the enamel. On one of the lamps the iron plate surrounding the flame-plate became discolored, and also showed signs of rust. I made a sort of whitewash out of liquid cement and asbestos, cleaned the soot from the plate and whitewashed it. That was six weeks ago, and the lamp to-day looks as well as it did when first purchased.

The President—I would like to ask if anyone here present knows of any high candle power lamp that in his opinion is equal to the Lungren. As no one answers, the opinion seems to be in the negative.

Mr. Nettleton—My experience is very similar to that which has been recounted here before. We commenced introducing the Lungren lamps for the purpose of giving our customers the very best means of burning gas, and also to try to satisfy the demand that exists everywhere for a larger amount of light. We rent them the same as others do, after trying and finding it impossible to sell. We rent them at $3.00 per year. Of that amount I presume there is paid for new burners and flame-plates at least $1.50; so that all the company gets is $1.50, or at most $1.75 per year from the rental. I believe it has been a good investment—particularly so in the case of one consumer. That was in a mill using gasoline, which I had tried very hard to secure as a gas consumer. They were induced to try a few of these burners, and liked them so well that they now have twenty in one department which, owing to the fact that they run all night, have averaged 6,000 cubic feet per day, six days in the week for several months. You can readily understand that the investment in such a burner is very satisfactory when burning that quantity of gas. While our Company has invested someting like $2,000 in these burners, I am very well satisfied that it is money well spent, and I would not, if I could, recall one dollar of it.

Mr. Slater—The President inquired if any other lamp had been introduced which was better than or equal to the Lungren. A few years ago we had a sample of the Wenham lamp sent out, and while I have not had a chance to make special experiments and tests of the lamp, the reports would indicate that it is fully equal to anything that I have seen done with the Lungren. It gives an almost perfect flame. The appearance of the lamp is very nice and it costs considerably less.

The President—Mr. Allyn raised a point in his paper that may not have caught the special attention of the members; which was his allusion to the fact that his Company had invested about $5,000 in lamps, and that sum might be considered rather an uncertain asset. I want to call Mr. Allyn's attention to the fact that his income from each lamp is $5.00 per year for rental, in addition to the profit on the gas sold through the lamps where they have been substituted for kerosene oil or the electric light. That profit should go against the unreliability of the asset; for the fact is that his rental is a good 20 per cent. per year return on the cost of the lamp. If he would credit the surplus of rent and income above the interest, and a sufficient allowance for depreciation, I think that the investment would be lessened very rapidly. The gentleman to whom I made reference a moment ago, as one who knows something on the subject of the Lungren lamp, is abundantly well qualified to tell us everything in respect to its defects as well as its advantages. Perhaps Mr. Stein will speak a word or two on the subject.

Mr. Stein—Mr. President and Gentlemen: On this my first visit to New England to attend the meeting of your Association I am happy to have had the pleasure of listening to the very able and interesting paper of Mr. Allyn, and the discussion on the Lungren lamp. The points presented in the paper and in the discussion are, of course, results of actual experience. We have had a great deal to contend with in producing a lamp that would meet all of the requirements, and as the defects referred to were simply of a mechanical nature, they could only be ascertained by experience. The defect with the enamel on the flame-plate was only ascertained after the lamp had been in use for some time; but as we have now abandoned the use of this kind of flame-plate no further difficulty is to be apprehended in that direction. The trouble with the bye-pass cock, also, was only discovered after the lamps had been in operation for a considerable period. We have overcome this objection by adopting a new form of cock which will in future obviate further trouble. As no further difficulty need be apprehended from the defects referred to, the remedy is already applied.

Mr. Allyn's reference to replacing defective cocks made me feel as though it was rather expected that the Company should do so without charge. While it was not our intention to do this, knowing it would represent but a small expense to the users of the lamp, and the cost of

replacing them being small, yet the sum total to the Company would be a very serious thing if it were compelled to do so. However, in view of the fact that we have met with such hearty co-operation from gas managers, and particularly from members of the New England Association, I may say, on behalf of the Company I represent (although it may be entirely out of place here), that we shall do our part as thoroughly as possible in securing a more general introduction and use of the lamp. I shall make an arrangement to-day with the Messrs. Waldo Bros., our agents here, authorizing them to exchange the defective cocks for the new long lever cock which we are now using—the latter being entirely free from the difficulties experienced with the others. This exchange will be made without charge.

I know that, in our efforts to introduce a practical high candle power lamp, we have been stimulated by the thought that it was desirable to give the gas companies something that would be a competitor of the electric light, which is constantly gaining strength; and the effort has cost us, as you perhaps all know, a great deal of time and a large expenditure of money, besides a great amount of patience. We feel that we have now successfully combatted the question, and have produced a result as nearly perfect as it is possible to obtain. I am very sorry that these few difficulties have occurred, but they were, of course, unavoidable.

With reference to a reduction in the prices of lamps, I wish to call your attention to the fact that, although the price may appear a little high, you must take into account the consideration that the lamp is very complete—not only as a lamp, but also in the addition of the very efficient regulator used in connection with it, without which no high candle power lamp can be successfully operated.

Since the lamp has been generally introduced, and our orders largely increased, we have been enabled to manufacture in larger quantities, and we have thereby been able to reduce the price. Again, it is our intention to make still further reductions, as the demand increases, hence it is largely left with you to aid us in this course; and I can assure you that every benefit will be given, if we are assisted by the users of the lamp and those handling them. Our policy is to supply the most practical and efficient high candle power lamp, at the lowest possible price. I thank you for your very kind attention.

Mr. W. A. Wood, of Boston, Mass., here read his paper, entitled

ITEMS FROM A SUPERINTENDENT'S NOTE BOOK.

While the items chosen for consideration cannot all be classed as novel, they were selected from a number of others as being best adapted to the present occasion; and in considering the change in methods of manufacture which they all involve it is proposed to simply state the advantages and disadvantages which have followed such changes—leaving it to the Association to decide on which side the balance lies.

ITEM No. I.—Sunday, June 14, 1885.—*Stopped Making Gas on the Day Watch.*—The question of Sunday labor is not a new one to the gas manager, and the field has been well covered by papers and discussions in this and other Associations; but it is thought worthy of consideration as it cannot be discovered that the entire cessation of gas making on Sunday has been attempted in works of a large capacity and continued from one year's end to the other. When the system was inaugurated at the North End Station of the Boston Company it was not supposed that it would be permanent. In fact to run things through the winter months in this manner was not considered practicable. Primarily, the change was made to do away with the long watch, thus relieving the men through the hot weather, and, at the same time, permit of some alterations in connections and apparatus. There was considerable grumbling on the part of the laborers, who did not consider that the advantages of the day of rest would offset the loss of a day's pay every other week. The system was adopted, however, and continued through the winter, as it was found of great benefit in relieving the scanty yard room of the small mountain of coke which formerly accumulated on the long watch. When, late in the fall of '86—owing to the heavy demand for gas—the order was given that Sunday labor should be resumed, it was something of a surprise to receive a delegation from the retort house hands who protested that the consciences of the men would not allow them to work on Sunday, and a general strike was threatened should the order be enforced. The injustice of a lock-out because a man wants to attend church is evident, and as between a question of some gas or no gas in the dark days of November there is no room for arbitration. Since the date first mentioned, with the exception of two or three days, when the situation absolutely demanded it, no retorts have been charged on Sunday between 6 A.M. and 6 P.M.

Aside from the benefit to the men, we have found relief from the immense Monday's surplus of coke before mentioned, which is not a small item when carbonizing 375 tons of coal, especially, if between Saturday night and Monday morning, kind nature sees fit to add several inches of snow to the pile.

We have a weekly opportunity for necessary repairs to any part of the plant, and the regenerative fires receive their only clinkering of the week on Sunday.

The Manager would doubtless be a curiosity to most of us who has not, on more than one occasion, endeavored to squeeze through the week on a limited supply without putting in retorts—knowing that Sunday would make his losses good, and who has not repented when the weather has knocked his calculations awry and left him with low pressure as the only alternative on the night of all the week when his consumers demand the most light.

Losing Sunday, the picture is reversed. With a low stock Monday morning, it becomes necessary to provide for the deficiency and gain all the week, and there is no inducement to run a race with the weather bureau.

The disadvantages are: The increased wear on the retorts—not great with proper care—and the increased gas expense; as, for a given weekly send-out, more retorts must be carried and extra coke is consumed and extra men are employed to tend the fires on Sunday.

ITEM No. II.—May 6, 1885.—*Began Using Naphtha for Enriching.*—This antedates No. I, but is considered second, as one of its chief advantages appears in connection with the weekly missing. Of the method of using it is unnecessary to speak. Many prefer this enricher, and each has his favorite method of converting it into gas. The amount and candle power obtainable from a gallon are well known, and its enriching value, as compared with cannel, is easily figured. One man can readily make 50,000 to 60,000 cubic feet of from 55 to 60-candle power in 12 hours; and in this fact has been found its great advantage in connection with the Sunday arrangement. After 12 hours' idleness the gas sent forward by the first benches charged is of low grade. By starting the naphtha simultaneously with the exhauster, 20 to 25-candle power is at once obtained, and the same holds good when shutting down Sunday morning—the naphtha being regulated so that the required candle power is maintained up to the time of stopping the engine.

ITEM No. III.—Aug. 26, 1885.—*Began Exhausting Direct from the Hydraulic Main.*—This question has also been well ventilated, and, it is believed, definitely settled in the minds of a majority of our profession; but at the last, or last meeting but one of this body the method was condemned as unreasonable and unscientific by a prominent engineer on the ground that all the tar and liquor removed by the condensers under vacuum was just so many tons dead weight to be carried by the exhausters when pumping the uncondensed gas. It was not at that time, nor is it now apparent to the writer why this work is not done by the exhauster whether working under vacuum or pressure—in the latter case the exhauster becoming a part, and, in our experience, a not inefficient part of the condensing apparatus.

The real objection to pumping hot gas is demonstrated in the problem, "How many more pounds of coke will it take to push gas at 130° than it will to pull it at 70° F" The increase in bulk due to this difference in temperature is one-eighth—and, if exhausting condensed gas with a make of, say, 20,000 cubic feet per hour, the speed of the engine is 40—to take the same gas direct from the hydraulic a speed of 45 will be required. The normal condition of the coke market in Boston is such that the number of pounds required to produce this extra speed has not been deemed worthy of computation. Our experience has been that where formerly a constant and thorough injection of oil, supplemented by frequent and heroic doses of coal tar naphtha, was the only treatment to be relied on to keep things moving. Now naphtha is dispensed with and oil is used on the bearings only, and in quantity so reduced that the saving in lubricants the first year averaged over $100 per month. We obtain a better line on the vacuum register, and less oscillation in the main; we are relieved of the apprehension that one or the other of the exhausters might bring up standing in the middle of winter, and, as one occasion, culminating in a crippled machine, broken in the attempt to start again. The annual dissection is abandoned; an exhauster has not been opened since the change was made, and has not stopped unless requested to do so by the engineer in charge. More thorough condensation is possible under pressure; actual tests show that nearly 5½ per cent. of the tar and liquor condensed from a ton of coal are taken out at the exhauster outlet.

ITEM No. IV.—Feb. 1, 1886.—*Stopped Clinkering Fires on the Night Watch.*—This refers to ordinary furnaces, and clinkering has since been done but once in 24 hours. It has been found sufficient; and heats are just as good if not better than when clinkering on each shift—the practice commonly adopted.

ITEM No. V.—*To Prevent Stopped Stand-pipes, Increase the Seal on the Dips.*—This memorandum is without date, was selected with

malice aforethought, in the full knowledge that it controverts all the books of the gas gospel from Clegg to King, that it contains any quantity of dynamite, and with the expectation that, after the explosion, something would be heard to drop.

The Secretary called for something out of the ordinary run, and to him the item is respectfully dedicated. Some time since a length of hydraulic main, on a stack whose days of usefulness are numbered, was found to be out of level. One bench, on the end of the main where the seal was lightest, was for a long time a source of annoyance from the frequent stoppages in stand and bridge-pipes. A depression in candle power having aroused the suspicion that the seal on this particular main was not heavy enough, it was raised a short distance. The trouble with the pipes ceased at once. To determine whether there was any connection between the two the seal was again lowered, and within a few days the pipes began to stop. In other parts of the works, under the heat of regenerative furnace, like happy effect has resulted from a slight raising of the seal.

A theory has suggested itself and is submitted as an interrogation. When a single lump of coal is thrown into a hot retort the minute particles thrown off by the sudden expansion of the imprisoned air, and instantly ignited, produce a shower of sparks, a display of fireworks familiar to all. This action must continue for some time after the lid is on, and may it not be probable that these now unconsumed but gasified particles of dust are caught by the rapidly ascending current of gas and, mixing with the condensing tar in the comparatively cool stand-pipe, produce the mixture which causes stoppages? With a low seal this action must be rapid, as the draught of the exhauster is more direct. With more seal there can be imagined a moment of repose after the lid is put on, perhaps a sufficient pause to allow these infinitesimal particles to settle on the body of the coal, or deposit as carbon on the sides of the retort. This may also explain the greater liability to stoppage with fine coal, and also why wet coal is a remedy.

In conclusion. The theory and the statement of fact are given, and may be accepted for what they are worth; but if any inquiring or skeptical member of the Association who desires to satisfy himself that this item should not have been dated April 1st will take his seat on the end of the main in question, and manipulate the seal under proper instructions, we will guarantee to convince him in from 48 to 96 hours that there are more things than he has dreamt of in his philosophy. A cordial invitation is extended to all.

Discussion.

The President—You have been treated to the reading of a very valuable document, containing five important points. I trust that each one of them will meet with your careful criticism, commendatory or otherwise. Mr. Wood will be very glad to answer any questions which may be asked him.

Mr. Armington—I desire to say, as far as I am concerned, that I do not remember having ever heard read before this Association, during the whole of its existence, a more practical paper than that which has just been placed before us by Mr. Wood. I think certain facts are set forth there which, although some of us have experienced, unluckily for us and unhappily for the rest of the profession, we have never made notes of. Here we have a practical man who gives us notes and reasons—good and satisfactory ones they are, too—for them. I think the facts set forth and the conclusions reached are worth the trip from New York to Boston simply to hear them stated. One item, however, struck me as being perhaps an over-statement, which was as to the value per month of the amount of lubrication got rid of. Perhaps it is all right, although it seems too large to me. The conclusion reached in regard to exhausting directly from the hydraulic main, seems to me to be perfectly correct from an engineering point of view.

Mr. Wood—The amount saved from lubrication is not taken from the Superintendent's book, but from the official records of the Company; and that is rather an under-estimate. The condition was a serious one. The exhausters were liable at any time to stop on us, and it required a good deal of power to run them. The only thing we found that would cut the sediment deposited in them was coal tar naphtha, which is expensive, and which we were obliged to use in large quantities. I think that $100 per month is not an exaggerated statement of the amount we saved in the year after making the changes.

Mr. Allyn—I would like to inquire what method Mr. Wood employs at present to vaporize his naphtha.

Mr. Wood—We employ what is generally called the Metropolitan method, because first introduced in the Metropolitan works in New York city the naphtha being run by gravity directly into the retort through a system of pipes. We have a one inch pipe inside of a 2½ inch pipe, and that again is inside of a 5 inch pipe—the largest pipe ending within 18 inches of the back of the retort. At the point where the naphtha comes down in the inch pipe it enters a T, and a small steam-jet is introduced there to prevent any forcing back from the stoppage of the naphtha. It is vaporized, and the steam is used only to regulate the heat of the retort. We do not run high enough heats to decompose the steam, as we have found from actual experiment a number of times. We find that the best results are obtained from a cherry red heat, and by running the steam so that that heat is maintained we have no trouble in making naphtha gas in almost any quantity desired.

The President—Have you an arrangement for noting the temperature of the retort except by removing the lid?

Mr. Wood—The lids are taken off every day. A little lamp black will gradually accumulate around the mouthpiece, and that is cleared away every morning on each of the retorts we run. A test of the quality of the gas is made by allowing a jet of gas taken from the stand pipe to impinge againse a piece of white paper; and the color which gives the best result, as we have ascertained, is that of a dark cigar. When we are making vapor instead of oil gas there will be no stain whatever.

Mr. Hallett—How much naphtha does Mr. Wood use per ton of coal?

Mr. Wood—Our average last year was ¾ of a gallon of naphtha to 1,000 cu. ft. of gas made.

Mr. Allyn—Has Mr. Wood had any experience in the use of oil instead of naphtha?

Mr. Wood—No; no not with crude oil. We have experimented with gas oil. I do not think that as good gas was made with that as when naphtha was used.

Mr. Nettleton—There is one part of Mr. Wood's paper which is of great interest to me, as I think it must be to all members of the Association, and that is the point referring to the stopping of stand pipes by lamp black, which they have prevented, as I understand Mr. Wood, by increasing the seal on their dip pipes. This is a very simple remedy, and I would like to hear more about it.

The President—I do not remember whether Mr. Wood stated the seal he carried.

Mr. Wood—The seal on the main which I described is a very peculiar one—probably three-quarters of an inch at one end, and barely a quarter of an inch at the other.

The President—What would you recommend as the best to carry?

Mr. Wood—I wish to say that the variation was very slight; but it prevented the stoppages in the stand-pipes from lampblack. If we raised it above a certain point we did not get the results we expected. It was a very slight increase that determined it. I do not wish to contend that the unlimited raising of the seal will stop the trouble to any extent. I think when the seal was raised it was raised from almost nothing to about a quarter of an inch, and it may have been more than that. I do not know as we determined the exact amount. At the time of the stoppages we were fairly certain we had no seal whatever on the bench that stopped up, because after the seal was raised our candle power went up to where it should be.

Mr. Neal—In the works under my charge stopped stand-pipes are of very rare occurrence—with no seal at all on the dip-pipes—by reason of using the McIlhenny process. My experience is very different from that of Mr. Wood. I run as nearly as possible a level gauge. Sometimes, in running a water gas plant, as the outlet from the water gas apparatus is into the pipe or main that leads from the exhausters to the purifiers, there is a very great back pressure; and then sometimes the gauge on the hydraulic main is not on a level, but shows a back pressure. I am surprised at it, after what I have heard Mr. Wood say, that we are not troubled all the time with stopped stand-pipes; but they are, as I have said, of very rare occurrence with us.

Mr. Prichard—It seems to me that Mr. Neal's experience, as well as my own, exactly bear out Mr. Wood's theory. We are both running the McIlhenny process, which, as you all know, consists, before taking off the lids, of filling the main with sufficient water to seal the dip pipes, and then charging the retort. The water is then drawn off, which takes four or five minutes, or exactly the check that Mr. Wood seems to desire to produce on the gas in the retort. It works against a three-inch seal for several minutes, and the gas is checked in just the way he describes. We have no stopped stand-pipes whatever, or not over a dozen in the course of the year, and those are brought about by carelessness.

Mr. Slater—If I recollect rightly it seems to me that that was one of the claims made by those who commenced to run without a dip-pipe seal. I think Mr. Armington will recollect about that.

Mr. Armington—I did not exactly get the drift of Mr. Slater's remarks. We have heard a great many arguments about stopped stand-pipes, and about the advantages of running without a seal. Some benefit may be gained by doing away with the seal at the time, yet in the end some other results will follow which will wipe out all the profits. I re-

member we used to be learnedly told that the reason we had a formation of carbon, and had stopped stand-pipes, was owing to the seals, and to the hammer-like blows made upon our retorts by the gas surging out through the seal. I think the gentleman who last spoke carried out Mr. Wood's theory exactly, when he said there was a time when that deposit of lampblack was stopped.

Mr. Slater—My point was that I thought you would recollect a claim made by one of the parties running with a valve was that they had no stopped stand-pipes.

Mr. E. C. Jones—I would like to say that at the South Boston works we are using a 2-inch by-pass with a valve in it, so that during four hours we run the retorts without any seal, but have had very serious trouble from stopped stand-pipes while doing so. I do not consider doing away with the seal a preventive of stopped stand-pipes. Our trouble comes at almost any time, without warning, and goes as quickly, and also without warning. We do not know to what to attribute it.

Mr. Lamson—When Mr. Jones tells us that he has trouble when he uses the bye-pass on the stand-pipes it seems to me he knocks out the last hope I had on the question of curing the trouble of stopped stand-pipes. We have at our works at Commercial Point all the retorts working with the regenerative furnace. I suppose we really carry more heat there than we did at the old station. We use on those stacks large hydraulic mains, which have a plate on the back side that can be taken off and so open the main. On many accounts we think this is a very good form to adopt. Since we started those works we have had more or less trouble with stopped stand-pipes, and have tried every experiment that ingenuity could devise, or that other engineers could suggest to prevent it. At times we thought that we had conquered the difficulty. We have run those retorts with very light seals, and with very heavy seals, and have run them with a seal of tar, and with a seal of water; but while at times we have had more or less success in running without stopped stand-pipes, in a general way there has been a good deal of difficulty. At one time within a year we thought we had remedied a great deal of our trouble by increasing the seal. We found that by taking the pressure on the retorts quite often that there was a variation, showing, as we thought, that some of the water had been driven out of the main by the oscillation of the water in the main, and that the seal had been somewhat reduced. We adopted the plan of carrying a heavier seal of water, and thought for a short time that that was the solution of the whole trouble. But that did not follow. Since then we have had trouble, and I confess that at the present time I am in the dark in the matter. I had expected to introduce some method of unsealing the dips. If Mr. Jones says that a bye-pass in the dip pipe does not prevent this trouble, it removes one of my hopes. I have no doubt that increasing the seal, where the seal is too shallow and the air is drawn in, will materially remedy the trouble; but that it will stop all the trouble in the stand-pipes, especially when running under high heats, I do not believe. As to what causes the thing I am at a loss to give a reason. I think it is due to a great many causes. I think that quite high heats, and the water hammering on the stand-pipes and in the retort all help to produce the stopped stand-pipes. We got the idea into our heads, from a statement of Mr. Anderson, that lampblack could not be deposited unless air was present, whereupon we formed the opinion that we must seal the dip pipe sufficiently to keep all the air out. We thought that the oscillation of the main and the varying pressure on the stand-pipe, might possibly draw some air in, and that we must have a seal heavy enough to overcome this; but we are giving that idea up now. In cases where the dip is entirely or absolutely sealed, we find we are troubled with a very large deposit of lampblack. I think, after all, the theory of Mr. Neal, running without a seal, is one thing which will conquer the trouble. In fact I recollect having visited Mr. Stiness at his works to see the operation of the hydraulic main from which he ran off the tar entirely, thus working with a water seal. Before that time he had a very serious difficulty from his seal and from his stand-pipes, but at the period of my visit he had so little trouble with the stand-pipes that when I expressed a wish to see how much tar there was in the main I recollect before he sent a man up to the hydraulic main he had to explain to him what he wished him to do about taking the plug out of the dip pipe, for the man was not well enough acquainted with trouble of that kind to know how to do it. This showed that Mr. Stiness was not then having any trouble with his stand-pipes. In thinking that over since I recollect he used a valve. I supposed his claim that he had had no trouble was perfectly correct; and on that line I had proposed to commence this summer the experiment of running without any seal at all.

Mr. Stiness—I would like to say that the matter of choked stand-pipes was once a favorite theme with me, and that I several times referred to it at the meetings of the American Association; but any man can go to the works of the Pawtucket Gas Company to-day and find choked stand-pipes almost the exception. One has never occured that I knew of, except where the carbon had been burned from the retort, and the stoker had neglected to clean the stand pipes in a proper way. This is a word which I want you to remember; for "neglect" causes a great many things to occur in gas works. One point in Mr. Wood's paper, which seemed to agree with my experience, is this. We use an unsealed main; but in charging the retorts the main is sealed 1¼ inches at all times, unless the valve is raised after the retorts are charged. The valves are not raised on the instant the cutter bar is screwed up, but perhaps after five minutes. Perhaps it may be that in that short space of time these sparks of dry carbon which Mr. Wood refers to may be checked. At all events it is a fact that a stopped stand-pipe in my works is a thing that has been, for several years, almost unknown.

The President—You are using a regenerator furnace, and carry high heats?

Mr. Stiness—Yes; we do carry high heats.

Mr. Lamson—(to Mr. Jones).—Do you open your valves immediately after charging?

Mr. E. C. Jones—The man who puts the lids on turns the screw, then, with his shovel, strikes the lever of the valve, and opens it; hence there is probably half a minute between the time the lid is put on and the time of the opening of the valve. We probably have two inches seal on the dips. We have never used the seal except where we have missed charges, and then we have closed the valves after four hours.

Mr. Lamson—You can prove this theory by keeping your valves closed for five minutes.

The President—We would like to hear Mr. Beale's experience with regard to this matter of stopped stand-pipes.

Mr. Beale—My experience is that stopped stand-pipes necessarily go with high heats; and I have listened with amazement to the remarks of these gentlemen who have high heats. I do not doubt their statements, but I am astonished that at such high heats they escape stopped stand-pipes. It seems to me that a low seal should always be adopted, where possible. I am greatly astonished to hear that a cure for stopped stand-pipes goes with increasing the seal, for that is contrary to all my experience. I do not quite understand how any one can have the high heats which go with the regenerative benches, and be able to make the statement that stopped stand-pipes are almost unknown happenings in their works. We have lots of trouble with them at Mott Haven whenever we have high heats.

Mr. Lamson—I will say that a high heat does not necessarily mean a stopped stand-pipe, because you can run your retort steadily, if your heat is even, at a very high heat and make a very large amount of gas if your mains are kept perfectly free. At the present time the difficulty is that there is nothing you can lay your hands on which is positive, and which follows out in everyone's experience, with regard to this question of stopped stand-pipes. Some will tell you that damp coal will prevent stopped stand-pipes, while other men will say that every time the coal becomes damp the stand pipes stop. One will tell you that high heats cause stopped stand-pipes, and another will say that he runs very high heats and never has one stopped. One will tell you that with a light seal he has stopped stand-pipes, and another will say that his never stop with a high seal, but always stop with a low seal. The question which is interesting me at the present time is whether lampblack can be formed and deposited without the presence of air. I am positive it cannot be. I know that some, who are equally positive, will say that it can.

Mr. Stedman—It is an entirely new theory to me—this necessity of the presence of air for the formation of lampblack. I think that those of us who have used naphtha in highly heated retorts have disproved this, because it is quite possible to be sure that your retort is under considerable seal, and at the same time make a bushel of lampblack in a very short time.

Mr. Lamson—How do you use naphtha?

Mr. Stedman—Put it in in any way—shovel it in, if you please.

Mr. Lamson—Then you shovel in air with it. Most people put it in with steam now, and the steam gives off a very small amount of air.

Mr. Stedman—We have often found that if the retort was too highly heated at the time of commencing to put in the naphtha, or if the charge of coal had been purposely made small, so as to allow of the introduction of naphtha, with the result of too great an increase of heat, it is quite possible to produce quite a large quantity of lampblack, which will show immediately, and perhaps in a degree will account for the stopped stand-pipes, although it is tolerably certain there can be no air in the retort, owing to the fact that there has been an evolution of gas for a long time, and the seal has been maintained constant during that time.

Mr. Lamson—In such a case as that you always get air in with the naphtha.

Mr. Stedman—Not if you put the naphtha in without any steam with it at all.

Mr. Lamson—How will you get it in?

Mr. Stedman—Our method at Newport used to be to have a tank containing naphtha under 20 pounds pressure, and then to inject the clear naphtha.

The President—I think that our friend Wood will, after listening to the exceedingly interesting discussion which his paper has evoked, feel gratified at the result of his effort in preparing a paper for this Association.

On motion of Mr. Armington, the thanks of the Association were voted to Mr. Wood.

The Association then adjourned, to reconvene at 3 P.M.

First Day—Afternoon Session.

The afternoon session was opened by the reception of a

Report from the Committee on President's Address.

Mr. Stiness—The Committee appointed to consider the address of the President have directed me to report that we have given the address due consideration, and fully agree with the President in the recommendation that your Committee appointed to report a list of officers for the ensuing year be requested to report a committee of three, to be selected from the list of officers whom they may recommend, which committee, if elected, shall be charged with the duty of securing the services of some scientific gentleman to prepare and deliver a lecture at the next annual meeting, on such day and on such subject as may be agreed upon by such committee. In regard to the second recommendation—causing the lecture to become a permanent feature of the annual meetings—the Committee were not unanimous, some thinking that, it being an experiment, perhaps it would be well to wait the development of the first lecture, they fearing that possibly it might deter some from preparing papers upon topics of local interest to many of the members, consequently the Committee do *not* agree to make the second recommendation. The Committee also direct me to report that they most heartily agree with the sentiments expressed by our President in his address, and express their approbation of the very able and explicit manner in which he has conveyed to the meeting the practical suggestions contained in his message. I submit the report in behalf of the Committee.

On motion, the report of the Committee was approved, and their recommendation adopted.

Election of Officers.

Mr. E. C. Jones—The Committee appointed to nominate officers of the Association for the ensuing year instruct me to report the following nominations:

President—A. M. Norton, Nashua, N. H.

Vice-Presidents—R. B. Taber, New Bedford, Mass., and C. F. Prichard, Lynn, Mass.

Directors—Horace A. Allyn, F. S. Richardson, H. B. Leach, W. A. Wood, and Z. M. Jenks.

Secretary and Treasurer—Chas. H. Nettleton, Birmingham, Conn.

Committee on Lecture—A. M. Norton, C. H. Nettleton, and C. F. Prichard.

On motion, the President instructed Mr. Stiness to cast the ballot of the Association for the nominees. The ballot was so cast, and the President declared the gentlemen named to be duly elected officers of the Association for the ensuing year.

An Introduction and Response.

The President—It gives me great pleasure to announce to you, and it must be heartily pleasing to you to hear it, that the Hon. A. M. Norton has been chosen to fill the responsible position of President of this Association for the ensuing year. With your permission I will appoint Messrs. Jones and Lamson a committee to wait on Mr. Norton to escort him to the table.

The President, renewing his remarks—It affords me much pleasure, in behalf of the New England Association, to welcome you, Mr. Norton, to the position of honor to which you have been unanimously chosen—that of presiding officer of this Association for the ensuing year. I may say that, personally and officially, I am of the opinion that the affairs of this Association will be conducted by you in a manner which will reflect credit on the choice of the Association; and that its continued progress and welfare will not suffer under your administration. Your associates have for years recognized your ability and intelligence as a gas engineer; your straightforwardness in all your business relations; and the courteous and gentlemanly manner in which you have always treated the members of this Association.

Mr. Norton—I thank you, Mr. President and gentlemen, for the compliment, and assure you that I feel highly honored in being elected President of this Association. I heartily appreciate this token of your confidence. I accept the situation more especially as a compliment to New Hampshire and to her gas engineers.

Mr. J. R. Todd, of Natick, Mass., read his paper on

THE RUNNING OF SMALL GAS WORKS.

Mr. President and Gentlemen:—Mr. Charles H. Nettleton, the Secretary of this Association, asked me by letter if I would prepare a paper, to be read before you at this meeting, entitled, "The Running of a Small Gas Works." I wrote in reply stating that as I never had prepared a paper on any one particular subject, I felt that I could not do so now; but if he wished me to I would try and give a sketch of how I had run the Natick gas works, since March, 1875. He accepted. Therefore, gentlemen, if you consider that such a paper will be interesting enough to you, I will proceed to read it. Well, then, so that you may be more able to judge correctly whether I have made a success of running the works, or to what extent I may have succeeded, it would be necessary for you to have some idea of the field I had to work in.

In 1875 Natick had a population of about 8,000, and up to the present time that number has increased to between 9,000 and 10,000; but the houses are so scattered over the township that there are only between 5,000 and 6,000 residing within what is usually called the Town of Natick; and none of these are wealthy people. At the time I took hold of the works there were not five dwelling houses in the town piped for gas, and not one of the shoe shops. Now I have 70 meters in dwellinghouses, and all the large shoe shops (except 2) are lighted with gas. One of the 2 did use gas, but is now using the incandescent electric light, while the other one is lighted with oil lamps—the owner is one of those old fogeys who cannot get out of the old ruts that his grandfather walked in.

In 1875 all the churches used oil; now, 5 out of the 6 are using gas and 2 of them have Lungren lamps.

The amount of gas sent out in 1875 was 1,501,800 cubic feet.

The amount of gas accounted for in 1875 was 1,136,500 cubic feet, showing a loss of 24 per cent.

The amount sent out in 1887, and in competition with a very powerful electric light company, was 3,491,900 cubic feet; of which quantity, 3,194,200 cubic feet was accounted for, showing a loss of 8 per cent.

I have now in all about 200 consumers.

In 1875 the price of gas was $4.00 per 1,000 cubic feet, with 10 per cent off for prompt payment. The price now is $2.70, with 10 cents per 1,000 cubic feet off all bills of less than 10,000 cubic feet, and 20 cents on all over that quantity.

When I took over the works the President of the Company remarked he expected, that for the first year or two, they (the Company) would have to put their hands in their pockets to help to run the works; and therefore, he hoped I would do the best I could for them. This is all and the only instruction which I have received from him or any of the Board of Directors.

Having thus left the whole charge of running the works in my hands, I, therefore, concluded that two things had to be done by me. First, to run the works on the strictest plan of economy possible; second, to try and gain as much as possible of the perfect confidence of my consumers.

First—The plan of running the works. I employed one fireman who comes to work at 5 o'clock A.M. His first work is to draw the furnace bars, and clinker the fire. then open the dampers, then prepare the retort lids for charging. By the time this is done the fire is nicely kindled up and in good shape for him to draw and charge the retorts—the first charge is always the lightest. When through charging he goes home to breakfast and returns at 7 A.M. He is also allowed one hour for dinner. If he gets to work by 5 o'clock his first charge is in by 6, and his fourth one is in by 6 P. M., allowing four hours for each charge. He then goes home, and I take charge of the fire. When it is necessary I put in a charge at 10 P. M., let it run for one or two hours, then bank up the fire and put in the dampers, being always careful to so arrange them that when the fireman comes in the morning he will find about a bushel or more of coke in the furnace to haul out before clinkering. When there is no need for charging at 10 P.M., I bank the fire at about 10.30 and lock up the works for the night. During part of the winter I have 2 firemen, and then run continuously.

There are in the works 2 benches of 3's, and one with one retort. During the summer, when the consumption gets down to where the single retort will supply the demand, I change on to that bench, and let down the bench of 3's until the fall; then change over again.

Regarding the tools used around the works. I always get what I consider to be the best (it always pays to have good tools), and I always have a place for everything, and see that everything is kept in its place. By enforcing that rule the men learn to be careful of everything they handle in the works; and I also let them understand that if they break or destroy anything through carelessness they have to pay for it. By this method I consider that a considerable amount of money is saved to the Company every year.

I keep a set of gasfitter's, carpenter's, and blacksmith's tools—at least, as many as are usually required around a gas works; also, a portable forge. With these I have been enabled to do nearly all the carpenter and blacksmith work that has been done in the place. I also dig out and build all my own fireboxes. I have laid all main and service or supply pipes, set all meters and take their indices, and make out and deliver the gas bills.

The reason why I now *deliver* the bills, instead of sending them through the mail, as was my practice in the first two years, is this. Several gentlemen told me that when receiving their gas bills in the post office they would put them in their pockets, forgetting all about them until after the date to which the discount was allowed. This of course made some of them angry, and they told me that if I would deliver the bills they would pay them at once, and thereby save the discount. I was quite willing to do so, although it gives me a great deal of extra work and responsibility; still, I wish everyone to get the discount on his bills. Nearly all of our bills are sent out quarterly, and we allow the discount to the 15th of the first month in each quarter. On that date I generally take a walk around the streets, for many have told me that they forgot all about their gas bills until they happened to see the "gas man" on the street. They will then call him into their place of business and pay the account. Also, on many of them I call into their stores or offices, to remind them that "to-day is the 15th—last day of grace." Whether they have paid their bills or not they will thank me for reminding them; and this is one of the means I have used to gain the end I had in view—namely, the confidence of my consumers. This brings me to the second, and, I consider, a very important part of running a small gas works.

We all know with what a suspicious eye a great many people look upon a "gas man" and his "gas meter," and we have all heard of the great frauds that have been perpetrated by some gas man upon some body's aunt or grandmother, who used oil all the *whole* month but did not let the gas man know about it; and how, at the end of that month, there was a larger bill sent in than for the month previous, when she had used gas all the month! I heard an old member of this Association say that Judas Iscariot was a gentleman compared to a gas man, in the eyes of this kind of people. Therefore, knowing all this, and also that I was a stranger in the town of Natick, I considered it my duty to try and gain, as much as possible, the confidence of the people.

Gas in Natick was something new, and, therefore, the people did not know how to use it economically. I led them to understand that I wanted them to get the most light possible with the least amount of gas; and, in order to convince them that I meant what I said, I made a good many changes in their fixtures, burners, and mode of using the gas. They were all using the poorest kind of burners; a good many had in use the old cast iron pillar burner, the others the common pillar. To get these all changed, I bought a lot of patent check burners, put them on their fixtures, and regulated the check to just the amount of light they required, then, in the evening, while all their lights were running, I checked the pressure at their meters until it just affected the light. I consider a check burner, a governor, or some other appliance for checking the pressure of considerable value to any one running a store, shop, or any large business place where there are a number of lights, and where the help have the lighting and regulating of the same, but who do not foot the bills.

By means of the various changes made, the gas bills were reduced very much, and this went a great way towards convincing them that I really meant to *help them;* and, by the same means, I was gaining their confidence.

As a slight proof of the amount of confidence they were placing in me, I will give you two out of many little incidents that have occured. One was in a saloon. I went to collect the gas bill—which happened to be larger than usual. The proprietor spoke of the bill being so large, and asked if I could not explain it in any way. There had been some very dull weather during that quarter, and I reminded him of the fact, and also asked him if he could not remember whether or not his billiard tables had been running a little more than usual that quarter. He thought the matter over for a little while, then said, "Yes, the tables have been more in use lately," and he seemed to be satisfied. However, one of those beats who are commonly found around a bar-room was standing near by, and he had heard the proprietor say that he thought the bill was a large one. So, Mr. Beat steps up to the proprietor (making sure he would earn a drink) and told him a wonderful story—that he knew to be true—about an aunt of his who shut off the gas for a whole month—but did not tell the gas company about it—just to see if that terrible company would send in a bill, whereupon, lo and behold! in came the bill on the first of the month, just the same as usual. The proprietor listened to him very attentively until he had finished his story and then simply said, "Well, this gentleman don't treat us in that fashion." And Mr. Beat got no drink.

The other incident happened with a gas burner agent who wanted to sell some burners to a storekeeper, which were to save him 50 per cent. over those that he was then using—the check burners that I had put on. The storekeeper asked him if he had shown his burners to the Superintendent of the Gas Company. Agent, "Oh! no; why there is no use in showing them to him; he would never recommend anything that would save the gas." Storekeeper: "Oh! yes, he would; and further, if your burner will do all that you claim for it he will buy everyone you have got and give them out to his consumers." Agent,—"That is all nonsense. Why, the very idea of a gas man saying that he wants you to save the gas!" Storekeeper, "If you will go and show them to the Superintendent and he recommends them I will have you put them on all of my fixtures." He never returned.

Another plan that I adopted. Whenever I see a gas jet in any store turned up so that it is wasting the gas, I walk into the store and turn it down until I consider that there is no waste. I also carry a burner saw in my pocket, and wherever I see a burner in a store or office that requires cleaning I walk in and clean it out. The storekeeper seeing this, appreciates and accepts it as a little act of kindness to him.

I also make it a practice after setting a meter to attempt to persuade the party it is set for to permit me to teach him how to read the index, and I have succeeded in teaching quite a good many to do so. Sometimes when I go to take an index, if the party is not busy, I will ask him to read the meter for me. If he makes a mistake I correct it, and give him further instructions.

I consider it would be a good thing for us if we could get every consumer to read and take notice of his meter, and for this reason. If a person notices his meter, he *knows* the amount of gas he is using, and, therefore, knowing how much his bill will be, when the account is presented he does not lift up his hand and exclaim,—"Why; there must be some mistake. I *know* I did not use that amount of gas, for I have been just as careful of it as could be," etc. I also tell everyone that whenever there is or if they imagine there is anything wrong, either with the gas or their fixtures, to let me know at once; and I always make it a point to answer these calls promptly, making no charge for the work I do in this way. The same with their gas stoves and Lungren lamps; if anything is wrong about them I fix it; and, if need be, I take them all apart, clean and set them up.

The gas stoves and Lungren lamps I rent or sell. When a customer applies for a gas stove, I set it up, and leave it for a month or two on trial. If they do not like it, or wish to try one of another make, I will exchange it; if they do not like that either, and do not wish to experiment further I remove it, making no charge except for the gas used. However, I have never as yet had to carry one back. I have between 40 and 50 gas stoves and 39 Lungren lamps in use.

The first year we paid all expenses; second and third, paid for a lot of main pipe each year; fourth, paid off a note that was due; in the fifth year we paid a dividend, and have done so each year since.

The average yield per lb. of coal for the first eight years, without an exhauster, was 4.24 cu. ft.; in the next four years, with a steam jet exhauster, 4.38 cu. ft.; three months, running continuously, in 1887, 4.47 cu. ft.; and three months in same year, running only in the daytime, 4.44 cu. ft.

Some of you might wish to know how the retorts stood the repeated firing up and letting down. I had one bench that was fired up and let down 7 times; fired up for the first time on March 10, 1875, and let down for the last time, May 26, 1881. Time in use, 6 years and two months; actual time in use, 3 years, 9 months, and 24 days. Another set was fired up and let down 3 times; lighted first on August 28, 1883; let down last time, October 3, 1886. Actual time in use, 2 years, 9 months, and 8 days—and good for some time yet.

Discussion.

The President—You have heard an exceedingly interesting report of how a man can run a small gas works; and if the same degree of efficiency could be carried into the management, in all its details, of larger works we should probably get even better results than we now attain.

Mr. Lamson—I wish to ask Mr. Todd what is the size of his retorts, and who made them?

Mr. Todd—They are clay retorts, and were in the works when I took charge of them. The works were built by Morris & Tasker, of Philadelphia, Pa. I inquired who the makers of the retorts were, but as all the papers were burned during a big fire that occurred about the time I went to Natick, all that I could learn was that they were Brooklyn, N. Y., retorts. Those were the ones that stood so long, and the ones now in use are part of the same set. I have two benches of threes, one of which has not been rebuilt since I went there. They are D retorts, 13 x 21.

The President—How many consumers have you? How many meters have you set?

Mr. Todd—We have about 220 now. When the electric light company people started in they adopted the plan of asking my consumers how much their gas bills were, and then offered to put in the elec-

tric light for something less. They got one or two of the influential parties to use the electric light by giving it to them for nothing. They also talked pretty well at the town meetings, and got such backing that the town voted more money last year for the electric light than they had ever done for any other light since it was a town. Still I consider that in being so anxious to get all the business of the town, they hurt themselves more than they did the gas company, because the result has been that they have caused a class of the people to become thoroughly disgusted with their efforts. Instead of hurting my business their efforts have increased it very much. We have got more gas lamps than ever before. Some people do not understand the reason until I explain it to them in this way: When they started in very few gas consumers took the electric light. There were only two storekeepers using all gas, all the others were using oil. That did not make any difference to me; and when the people of the town saw the electric light they said it was so much taken out of the gas company's pocket. Now there are a good many of those who have left the electric light, and are using gas. The Lungren lamps which I got for a church have given great satisfaction. I now have them in two churches, in one of which three Lungren lamps perform all the illumination; the other—it is a smaller church, is lighted very well with one 16-foot Lungren lamp and ordinary side lights.

The President—There is no doubt but that the practice of Mr. Todd, if it can be carried out in detail, will be of great value to all gas companies. I certainly commend earnestly to the attention of the members of the Association his custom and practice of giving careful attention to the condition under which gas is burned by the consumers. A great deal of complaint comes to us because they do not consume the gas properly, and have not the proper means of doing it. I apprehend there is not anything like a sufficient attention given to these items by the managers of gas companies. I noticed a paragraph in Mr. Todd's paper, which stated that when he saw a gas burner in a store or window that was wasting gas, he went in and attended to it; and when that paragraph was read I perceived it caused some smiling. Still this is a very important point, and one that will be appreciated by the gas consumers, for just to the degree that you gain their confidence you will succeed in your business. I know it to be so from experience. I think that plan is to be commended. His plan of following up his consumers carefully, to see that they pay their bills promptly and get the benefit of discount is also to be commended, although it would not be so easy to do it if he had two or three times the number of consumers that he now has. However, it is well to do so in his case, where he can attend to it.

On motion of Mr. Taber, the thanks of the Association were voted to Mr. Todd.

ANOTHER INTRODUCTION.

The President—We have with us this afternoon Mr. Ridlon, ex-President of the Boston Electric Club, and for more reasons than one I think the gentlemen of the Association will be glad to have him introduced. It gives me pleasure to introduce Mr. Ridlon, because he is actively connected with an industry which some of the members of the Association have been giving more or less attention to.

Mr. Ridlon—Mr. President and Gentlemen: I have, indeed, to thank you for the kind invitation issued to me to attend the opening session of this convention. I cannot but feel that this is a movement in the right direction. As one interested in the electric light business, it has been my earnest endeavor for the last three or four years to bring about a unity of interest between gas and electric light companies, and I am gratified to see to-day there is a probability of success in this direction. We are all engaged in meeting the demand of the public for some kind of light, and I do not know why any of us should take it upon ourselves to decide which light the public shall have. Let them decide it for themselves, and we will be very glad—that is, meaning the combined gas and electric light company—to furnish them anything they desire, they paying a fair and proper price for the same. I do not think there is any occasion for us to make any public attacks upon each other. We are all a pretty good set of fellows, and when we come together we find it out. We have been looking at each other at a distance until recently; but when we come together occasionally, as we have been doing in the past year, and are able to shake hands with each other, we find, as gas men and as electric light men, that our interests are so nearly identical that it will be for our mutual interest to work together in harmony. (Applause.)

Mr. C. J. R. Humphreys, of Lawrence, Mass., read a paper on

A NEW WAY OF UTILIZING AMMONIA LIQUOR.

The gas manager of the present day finds himself in a rather unique position in that the cost of coal as well as many other articles which go to make up the gross cost of gas manufacture, are steadily and surely increasing, and in like manner there grows a demand on the part of the public for cheaper gas—a demand which is often pressed home by our new friend, or rival, call it which you may, the electric light. The two growths do not blend well together; on the contrary, they are decidedly antagonistic, and present to the gas manager a very complex problem, a problem, however, which it is not the purpose of the present paper to attempt to solve, suffice it here to remark that the proposition, in very many cases, can only be worked out by the help of the by-products of gas making—coke, tar, and ammonia.

Of these three residuals coke and tar will generally take care of themselves, though possibly we should except the very large gas works; for if the demand for coke grows slack we will generally find an obliging body of coal miners or other laborers will strike, and thus by raising the price of coal increase the demand for coke. In most cases the tar trade can be worked up by the aid of the sidewalk makers, and we are left with the remaining residual, ammonia water, to dispose of. And here we find that means of increasing our revenue from this source do not so readily present themselves. True, in the case of the most extensive gas works, the quantity of ammonia liquor for sale is so large as to warrant the erection of ammonia works in the vicinity of the gas house, either by the company itself or by an outside party; but it is not gas works of the first magnitude that we are very much interested in. What more particularly concerns us is the small and medium-sized concerns, and here we find the disposal of ammonia water at a figure which, after deducting freightage, will net the seller any appreciable figure is indeed a difficult task. The trouble is apparent. The ammonia works are generally found near the largest gas works; hence the smaller concerns, situated at a distance from the large centers, have to pay for transporting the liquors many miles. When it is remembered that in ordinary gas liquor, of say ten-ounce strength, the weight of the contained ammonia bears but a small relation to the weight of the liquor, it is clear that the sulphate or aqua maker cannot afford to pay such a sum for this product as will, after deducting the expenses involved in handling and transporting for a considerable distance the ammonia and the useless water, return the gas maker any considerable revenue.

One proposed solution of the problem is that the gas companies should erect sulphate works within their own inclosure, and either sell the product in their immediate vicinity or send it to the larger centers; but it has generally been found in this country, that the running of a sulphate works by a medium-sized gas works is an undertaking of uncertain profit, but certain trouble. Consequently for gas works of moderate pretensions we are forced to find some way that the ammonia water can be so concentrated that the weight of the liquid shall not bear an undue relation to the weight of the contained ammonia—if we get the liquor to a strength of 70 or 80-ounce we approximate the solution of the difficulty. Obviously, we cannot produce a liquor of so concentrated a form in the apparatus used for purifying the gas, so we must get it to the desired condition by some other means. At the Lawrence gas works we have recently erected a plant which seems to fill the bill very well—it was put up by Mr. Page, to whom we all, I think, are greatly indebted for having done so much to increase the value of ammonia water in this country—and the rationale of the system is that the ammoniacal liquor of ordinary strength is distilled in an iron tank by steam heat, and the ammonia is condensed in a more concentrated form so that the amount of this product which is contained in a thousand gallons of the ordinary liquor is brought down to a compass of about 150 gallons. The apparatus consists of a series of three boiler-like tanks or stills and several condensing boxes, the stills being set in mason work, side by side, with the smallest one elevated between them.

The first tank or still, which is 5 feet in diameter and 9 feet long, contains a steam coil, the next still is 4 feet in diameter and 5½ feet long, while the smallest one is 2½ feet by 4 feet. Surmounting these is a column or washer 2 feet in diameter by 3½ feet high; the condensing troughs are about 13 feet long, 1 foot high and about 15 inches wide; these troughs contain a double row of 4 inch wrought-iron pipes, through which the ammonia vapor passes until the cold water running through the troughs condenses these vapors to a very strong solution of ammonia water. From the last of these troughs the ammonia passes to an iron tank, 2 feet by 3 feet, and from here passes to a small receiving tank set on the floor of the building. When this is filled the liquid is allowed to run to the large receiving tank, being an iron boiler shell holding about 4,500 gallons set outside the building.

At the commencement of a run, the largest still is about two-thirds filled with the weak liquor, steam is then admitted to the oil and the ammonia, with some steam, is driven over into the second still, thence to the third one. Here the temperature is such that some of the steam accompanying the ammonia is condensed. The ammonia then passes to the column or washer, when the condensation is continued, and the operation is completed in the three troughs by the cold water which is constantly running through these vessels. The whole layout of the apparatus is such that the ammonia will be condensed gradually, for were the work performed rapidly, trouble would doubtless be occasioned by the crystallization of the ammonia. The operation is continued for about eight hours, or until the liquor in the first still is reduced to half ounce strength or less.

The concentrated liquor is stored in an underground iron tank till such time as sufficient accumulates to fill a tank car, when it is pumped to the car on the gas works side-track.

As we have laid out the apparatus at Lawrence, we are able to run very economically. The two agents used in the operation are steam and water, the former to distill off the ammonia, the latter to cool the vapor; and our arrangements are such that the water used in the troughs, after doing its work, is allowed to run into a leaky gas holder tank, and the condensed steam as it passes from the still is led to a small tank over the sink used by the retort-house men for washing—thus giving the men a constant supply of hot water. The overflow from the tank is connected with the pipe which carries off the water from the troughs, so the water from this point also finds its way to the holder tank. If the water is not needed in the holder tank it can be used for quenching the hot coke. Thus the only expense to us in running the plant is the fuel used in making the steam

and the wages of the boy who takes care of the apparatus. The former item is not large with us, as we use breeze and cinders for fuel. The labor item is not heavy as the boy also looks after the concentrator, and runs the exhausters and the standard washer, as well as keeping some of the memorandum books of the works.

I am now considering the advisability of running the condensed steam to a large tank and pumping it back to the boiler before it has a chance to cool off.

In order to arrive at an estimate of the amount of steam which the concentrator requires, I recently made a test by measuring the condensed steam resulting from an eight hours' run. Knowing that a much larger quantity of steam is required at the earlier stages of the run, I caused the condensed steam to be collected at the end of each half hour, with the following results:

TABLE SHOWING THE GALLONS OF CONDENSED STEAM SAVED DURING EACH HALF HOUR, FEBRUARY 6, 1888.

Half Hour.	Gallons of Coudensed Steam.	Half Hour.	Gallons of Condensed Steam.
1	35	10	21
2	70	11	21
3	59	12	21
4	24	13	17½
5	21	14	17½
6	21	15	17½
7	21	16	17½
8	21		
9	21	Total	427

From this it will be seen that the run required the evaporation of 427 gallons of water, or 3,558 pounds. To evaporate this quantity of water we require about 600 pounds of breeze. This, at the price at which we sell it, would net us about 15 cents; consequently, this sum would represent to us the cost of the steam used in a run, for, as before noted, the water from which the steam is generated is made use of after being condensed back to water. The further details of the run, to which the foregoing figures relate, are as follows:

Quantity of weak liquor used	1,000 galls.
Strength of same	10 oz.
Quantity of concentrated liquor obtained from above	142 galls.
Strength of same	64 oz.

It will be noted that the strength of the strong liquor on the day during which the above test was made was only 64 ounces. This was considerably below what we had been running at. The day previous the lad had run the liquor above 90-ounce; and, as a result, had a stoppage in one of the pipes from the crystallization of the ammonia. I cautioned him against running so high, hence, on the day of the test, in his endeavor to keep within my instructions, he had run down lower than necessary. We try to keep the concentrated liquor at about 80-ounce.

The effectual manner in which this scheme meets the transportation problem alluded to at the outset of this paper is indicated by these figures, which show that the ammonia contained in 1,000 gallons is compressed into a space of 142 gallons; or, instead of transporting 8,715 pounds we convey only 1,570 pounds. The apparatus gives us very little trouble, and while we have not had sufficient experience with it to know yet just what the result in dollars and cents will be, still we are confident that it will bring in a good return on the investment.

Discussion.

The President—You have listened to an exceedingly interesting and carefully prepared practical paper on a practical subject. I hope you will not let Mr. Humphreys take his seat without questioning him thoroughly upon any point not made entirely clear by him in the paper.

Mr. Lamson—How much liquor can you reduce in a day by that apparatus?

Mr. Humphreys—One thousand gallons in eight hours. Now we are running only one charge per day; but three charges can be run, if necessary. In fact, in some respects that would be the more economical way, because a large part of the steam is used in heating up the entire apparatus at first, and if you run continuously that would be saved. In the first hour there is condensed from the steam 105 gallons of water out of 427, being one-quarter of the whole amount.

Mr. Coggeshall—What is the expense of the apparatus?

Mr. Humphreys—It is something under $2,000.

Mr. Beale—Mr. Humphreys speaks of his ordinary liquor as being 10-ounce. How many gallons of such liquor does he get per ton of coal?

Mr. Humphreys—I made some tests some time ago, but cannot remember the figures. We have a standard washer, but this liquor which we use is the liquor from the entire works. Of course, if we were to keep the standard liquor separate, I suppose it would show about 18 ounces; but in the mass we have, the standard liquor, combined with the liquor from the condensers, washers, and hydraulic main. It runs from 9½ to 10 ounces.

Mr. Allyn—When you are running more than one charge in 24 hours, would you feed it to the apparatus continuously, or run off one charge, then charge up your still and run off the next?

Mr. Humphreys—I would run off one charge to about half-ounce strength, empty that out, and then put in a new charge.

The President—But you would not be able to keep it continuously at work, and run off three charges in 24 hours, for the reason that you would not have a sufficient quantity of liquor?

Mr. Humphreys—No. We do not run it all the time now. We ran it last week, but will not probably start up again for a couple of weeks. In the summer season I do not suppose that we will run it more than one week out of six.

Mr. W. A. Learned—I wish to ask Mr. Humphreys whether he sells this concentrated liquor to aqua works or to sulphate works. The point of my inquiry is to ascertain what advantage this concentrated liquor would be to a sulphate works. I know there would be an advantage to aqua works; but would there be any advantage in selling it to parties who are manufacturing the sulphate of ammonia?

Mr. Humphreys—I think that it is used chiefly by aqua works. Regarding the point as to how much more it would be worth to sulphate works, I cannot say. Of course the question of the expense of transportation comes in. You could not afford to send 10-ounce liquor to New York to make aqua or sulphate, or anything else; whereas, as matter of fact, we can afford to send the concentrated liquor to New York. Mr. Page can probably tell us more more about what he used it for than I.

Mr. Learned—I got the impression that this concentrated liquor would not be of any advantage to sulphate works, over the ordinary strength of liquor which we send to their works at the present time.

Mr. Nettleton—I would like to ask Mr. Humphreys what proportion of the time of the young man referred to in his paper is consumed in running the concentrator? That is, in the eight hours' run, how many hours does he devote to it? Also, is there much trouble from stoppages? Also, how he manages to use breeze exclusively in producing the steam required for the concentrator?

Mr. Humphreys—I can hardly state just how many hours the lad works on the ammonia apparatus. He is in and out of the building all the time. The engine room, where the exhauster is running, is on one side of him, while the standard is on the other, and he goes back and forth through the three rooms. I suppose it would be fair to charge half of the time to it. As he gets more accustomed to the apparatus he is in there a smaller part of the day, and I am in hopes, after he has run it for a month or two longer, it will not even require so much time as it does now. Besides attending to the other machines which I speak of, he also keeps some of the memorandum books of the works. Of course those are kept right in the same room, so that there is no trouble in his doing the two things. With regard to the stoppages, I may say that I think we have had but two since we started up; and each case happened when they were running the liquor up to 90 ounces. Of course, if you want to run as high as 90 ounces you are going to have some trouble. I found that when they ran along about 80 ounces, or 75 ounces, we had no trouble at all. I suppose the reason we can use the breeze to better advantage than Mr. Nettleton is because our boilers are very much larger in comparison to the work that they are called on to do. We have a large draft, with a stack 80 feet high, and we find no difficulty in burning the breeze and cinders without any coal or coke during the day.

Mr. Nettleton—And without a blower?

Mr. Humphreys—Without a blower. We have a stack 80 feet high, and that gives us a very good draft.

Mr. Coggeshall—As I understand you, you would employ that young man any way, so that it is practically no extra cost to you for his work. I would be interested in knowing what would be the net profit to you, or the profit price which you receive per ton of coal for the concentrated liquor?

Mr. Humphreys—I think it will be somewhere about 18 cents per ton.

Mr. Coggeshall—That is your net price, after taking out all expenses?

Mr. Humphreys—Yes. Of course, the net profit depends upon the price of ammonia. If the price of ammonia increases we shall have a chance to realize a larger return.

The President—This is a very important subject. It is a move in the right direction. It is an effort to give us an income from the residual which many of us in former years allowed to go to waste—as far as gas companies were concerned, although in some cases this waste was of great public benefit. It was notably so in our own case. During the past year we erected an apparatus similar to the one described by Mr. Humphreys. Prior to this time, for a period of over a third of a century, we had been purifying one of the streams, which in passing through our city takes up a great deal of sewage, by reason of the amount of liquor which ran into the stream from the gas works. Having ceased to render such service to the city, and having reduced the price of gas to a very low figure, and there being an established Health Board, whom we did not want to entirely leave without occupation, we stopped running the liquor into the river and put in our works a concentrating arrangement precisely similar to that described by Mr. Humphreys. I think perhaps we preceded him a little, and so may claim credit for having set him the good example. We have operated it with great success. The apparatus was put in, the work of installation having been done in a thorough, practical, straightforward, business-like way, by Mr. Clapp, of Pawtucket, R. I. Now as Mr. Clapp is in the room I am quite sure the Association will be glad to hear from him on this subject more in detail than Mr. Humphreys has gone. I have pleasure in introducing to you Mr. Clapp.

Mr. Clapp—I will not take up your time by making any extended remarks with regard to the paper which has been read. I might, perhaps, add to it a little, following out the suggestion of the gentleman who read the first paper here to-day, by stating one of the "outs." This apparatus does not recover the fixed ammonias which

the ammoniacal liquor contains—by the fixed ammonia I mean the sulphate, the chlorides, and the cyanides of ammonia. These salts require a high temperature to volatilize them, and they are not distilled over with the other salts of ammonia. But, these fixed ammonias are small in quantity and vary in different gas works; in fact they vary in the same gas works at different times. You will find almost none in the scrubber water. They are almost exclusively confined to the hydraulic main water. This is a difficulty which cannot be overcome. It is also true of all stills which are used where sulphate of ammonia is made. In distilling the water into sulphuric acid (which is the method now used in making the sulphate) the fixed ammonia will be left in the liquor and also in the still. This, in large works, is recovered by running these tailings into another still, treating them with lime, and distilling off the ammonia; but in small works this will not pay. This concentrating apparatus is designed more especially for small gas works—distilling from 2,000 to 3,000 gallons of ammoniacal liquor in 24 hours. For the larger works, I think a continuous process would be better. This concentrator, as we call it, runs with very little attention. I think you will agree with me that we can make a distinction between an apparatus which runs easily, and one that runs with little attention. The concentrating apparatus does require some skill to manage it—the more the better; but it does not require a great deal of time to attend to it. That is what I mean. I thank you, Mr. President, for calling on me; and I will not take up the time of the convention by making any further remarks.

The President—Before you sit down I would like to ask you whether this apparatus could not be reduced in size and yet be just as efficient as that which Mr. Page put in for Mr. Humphreys. Whether it could not be reduced to half the capacity, and proportionately reduce the cost; so that it might be introduced into very small gas works profitably?

Mr. Clapp—I do not think it advisable to put in any smaller size of apparatus than the one in Mr. Humphreys' works. It costs nearly as much to make one of half that capacity as it would for one of that size. In these stills the charges are about 1,000 gallons, and you have to run them only just half as often as you would if they held only 500 gallons. I would, therefore, advise every one to use a still of the larger size.

The President—Does any gentleman wish to ask Mr. Clapp any further questions? This is an exceedingly important matter, and we fortunately have with us to-day a gentleman who has been—to use an expression which you will all understand—in a certain sense, practically the educator of Mr. Clapp, Mr. Humphreys, Mr. Nettleton, and other members on this general subject. He is well able to answer the questions which were propounded on this subject to Mr. Humphreys, and which the latter could not answer, as to the economies of the use of the concentrated liquor under various conditions. I have the pleasure of calling upon Mr. George Shepard Page to give us what further information we need on this subject, hoping further that he will not forget to tell us what the prospects are of an increased income beyond anything which has yet been obtained from this source.

Mr. Page—I am very glad indeed that you have had the pleasure of hearing from a more interesting speaker than I am, in the person of my associate, Mr. Clapp. The advantage of the concentrating apparatus is almost exclusively to get ahead of the railroad companies. It is the invention of a Rhode Island "Yankee." By shipping the ammoniacal liquor as ordinarily made, a railroad company would in the charge for freight get the whole value of the residual at the end of 50 miles. But, when put into this concentrated form, it can be sent 1,000 miles, and it then is worth as much to the small gas works, per ton of coal carbonized net, as is being paid to the large gas companies here, or anywhere in the world to-day. These two points, the small gas companies with their cheap steam and no additional labor (because I do not know of any one who has employed an additional man to care for the apparatus, among the six or eight which we have so far put in operation), as compared with the cost and greater expenditure at larger works for coal, steam and labor, put the smaller company on a footing with the larger in this respect, and so enables them to realize a profit. The other point to which you direct my attention is as to the prospective outlook for this residual. I may say that five years ago no English gas company was receiving less than 50 cents per ton of coal carbonized for the ammoniacal liquor. The Leeds Gas Company, carbonizing 600,000 tons of coal per annum, received, in 1882, 75 cents per ton of coal carbonized for the ammoniacal liquor. I have before told you why the fall came. It was the result of the importation of enormous quantities of nitrate of soda from South America. The debt which had been created by the war between Chili and Peru having to be rapidly paid, they flooded the markets of the world with nitrate of soda. That has been used by agriculturists as a fertilizer, instead of the sulphate of ammonia. That depression still continues, although it is gradually passing off. Within the past six weeks there has been an advance in the price of sulphate of ammonia in the London, Liverpool and Leeds markets, of 20 per cent.—from £10, 6s. to £13 per ton. There has been some slight advance here, and the price ranged here a little above the price on the other side. The largest part of the product of ammoniacal liquor in this country is yet being used for making sulphate of ammonia; but a large and growing percentage is consumed in manufacturing aqua ammonia. My friend and associate, Mr. Clapp, has been for many years so engaged. This product is being used almost exclusively for another object—artificial refrigeration. The little villages as well as large cities in the South; the hotels, the forts in the West, and the ships on the sea are now able to make ice at a cost—if making 50 or 100 tons per day—of 80 cents per ton. They are making pure ice down South from distilled water. It can be made on shipboard—as it is made on the "City of Para," running between New York and Aspinwall, which vessel carries an ice machine, occupying a space not much larger than that table, that has been in use for the past two years. Every pound of food eaten on that ship, and as much butter and cheese as is transported on the round trip to Aspinwall (21 days), is preserved by the cold thus made. In that time they have not lost a dollar's worth of meat or an egg. With 60 tons of ice on board during each trip before they commenced artificial refrigeration, their fresh meat only lasted seven days. This will give you an idea as to the advantage of artificial refrigeration over natural ice. The cheapest and best agent—an agent that has no disadvantage, because it is not inflammable like ether, and is not dangerous, like some of the sulphur compounds—is ammonia. That industry is growing rapidly. A company now organized and in active operation dispenses even with these ice machines, which cost from $3,000 for small to $100,000 for the larger sizes. One brewery in St. Louis, Mo., has half a million of dollars invested in ice machines. Not a pound of ice is used in one brewery in St. Louis, and I believe that can be said of nearly all the breweries in the country. And so it can be said of the great storage and slaughter warehouses in Omaha, Kansas City, St. Louis and Chicago—they are all artificially cooled by ammonia. The company which dispenses with the use of these great machines for compressing the ammonia, and then expanding it and letting it go through pipes, the water being passed around the pipes to carry off the heat, furnishes to hotels, restaurants or storage warehouses a tank of anhydrous ammonia. That is the gas compressed to a liquid. This is allowed to expand, and the refrigeration is regulated by an electric valve. You may want one room at 45° for fruit, another at 35° for meat, and yet another at 20° above zero for fish. That valve will allow just the quantity of ammonia to pass which is required for these various purposes. The ammonia passes on to a receiving tank of water, where it is caught. If it is a large industry, like a storage warehouse, the operation is made continuous. On 23d street, New York, a four story building is being fitted up by this company, where all the various uses to which this system can be applied will be shown.

A few pounds of the anhydrous ammonia is ample for keeping all the food a family would require for 30 days. The aqua ammonia is taken away at the end of 30 days by the refrigerating company and converted into the anhydrous again. This 23d street house is being fitted up with pipes which will be used in the winter time for warming with steam, and in the summer time for cooling with ammonia. One very hot day I sat in the office of the president of the Arctic Ice Machine Company, at Cleveland, Ohio—the thermometer was up in the "nineties;" and, said he, "Page, would you like to get cool?" I exclaimed, "Bless the Lord; cool me off!" He closed the door and windows and turned a valve. In just 10 minutes I had to get out of that room and into another where it was warmer. He told me an amusing incident about an old darkey—an old retainer of his—who came one day in midsummer to see him, having had to travel a long distance. When the colored gentleman entered the office every window was open, but the president got up and closed the windows, then shut the door; and then, without the darkey noticing it, turned on the valve. The visitor soon began to shiver. Pretty soon he got up and put his coat on, and then buttoned it up around him. Speedily his teeth began to chatter, whereupon he exclaimed, "Massa, I guess I got dem old shakes back agin!" The thermometer had gone down from 90° to 50°. That is simply an illustration of the near possibilities of an industry which last year caused the expenditure of nearly three millions of dollars in the building of ice machines. I want to say one thing more in order to give you an idea as to the probable future demand for ammoniacal liquor. I have no question but what there will be, while not a rapid, at least a steady demand for this product; and that five years from this time there will not be in any gas works in this country carbonizing 500 tons of coal, a single gallon of ammoniacal liquor wasted. Further, the small gas companies, under this system for getting ahead of the railroad companies, will be receiving just as much per ton of coal carbonized as the large companies.

On motion of Mr. Greenough, a vote of thanks was given to Mr. Humphreys for his paper.

Mr. W. H. Snow, of Holyoke, Mass., read his paper on

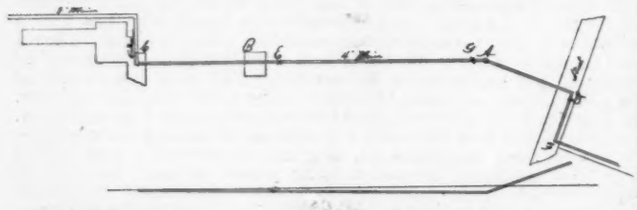
A VAGARY OF NAPHTHALINE.

Mr. President and Gentlemen of the Association:—While not pretending to be able to throw any additional light upon this vexed question of naphthaline, still, owing to the importance of the subject and the prominence it will occupy, at least until after the next meeting of the American Association, I thought it not amiss to relate a freak of the pest, as it visited us the past season, hoping someone may receive a hint from the discussion it may provoke which will prove of value in solving this knotty problem.

To begin with, we are among the favored as to our troubles with naphthaline. It is only within the last six or seven years that we have known what the article was, with the exception of an occasional stoppage of the inlet to the holder; and since it has shown itself upon the street we never have had more than 15 stoppages in any one season. We have varied from that to as low as three or four in a similar period of time. One feature of the trouble has been that in seasons when we were troubled with the service pipes we would have no stoppage of the inlet to the holder; and when

the latter was stopped, we could have the satisfaction of knowing that we would have no trouble with our mains or services. Another peculiarity is that we have been able to rest in peace for nine or ten months of the year, knowing that our enemy was quiescent; but as surely as the middle of August came, so surely would more or less trouble from naphthaline come also. This trouble would continue until about the middle of October, when we could feel assured the visitations for that time had ceased.

The particular vagary of the erratic visitor which is the subject of this paper occurred in our last season's experience. True to the calendar, when the middle of August came, so came naphthaline; but, this time, it changed its usual *modus operandi* by attacking one of our mains instead of confining its attention exclusively to insignificant service pipes. For a perfect understanding of the case, it will be necessary for me to digress somewhat and explain the plan and profile of our main. This you will understand by refer-



ence to the drawing. The main in which the trouble occurred extends through a mill yard, owned by a large thread company, over which we have a right of way, but the owners have taken the right of building over our pipe. The main as it enters the yard is 8 inches, on the short cross-piece it is 6 inches; and there it reduces to 4 inches, and runs along to supply a row of mills further on. At A is a drip towards which all the 4-inch pipe from the 6-inch pitches though with a very close grade. Beyond the drip it rises with a sharp pitch to the street; and the main from the point F drips back to A. The first intimation we had of any trouble was through a complaint of "poor gas" from the first mill upon the line. Of course, we expected to remedy it by pumping the drip; but though we drew out some water no real improvement was accomplished. We then looked further on. The service pipe was all free, hence the main must be stopped somewhere. The thread mill services were all right, so that fact located the trouble between them and the mill that complained. We followed the main back to the point D, but the stoppage was back of that. The main was so thoroughly choked that, by holding my hand at the end of the ¾-inch lamp service, I could not perceive any flow of gas. Then we drilled at E. Here was plenty of gas. Then we tried again at G, and there we found the trouble. The main was almost solidly filled with the beautiful pearly-white crystals. We were able to clear the pipe by pouring benzine in at the point E, letting it run along with the gas, the vapor effectually doing the work. For three weeks we had more or less trouble at this point; but the same treatment always remedied it for the time being. At the end of a certain time it departed as suddenly as it appeared; nor have we been troubled since at that place, and, perhaps, may never again be.

Now, the question is, "What caused the deposit of naphthaline at that point?" The portion of the building at C is simply a tower containing a dust flue from the pickers, and, with the depth of the pipe under it, it would seem that that need not enter into the problem. The building at B is a drying house, used for seasoning lumber out of which spools are made, where they carry a temperature of 150° F. The building is practically all one room from the cellar up. There are only three or four inches of dirt over our main, and it is safe to say the temperature at the cellar bottom is as high as 100°. Now, with our pipe passing under this cellar, and the gas becoming more or less heated, and then becoming suddenly chilled by contact with the cold pipe further on, are the right conditions for the depositions of naphthaline produced? If so, why did we not find it at the point E, about 40 feet from the building, instead of at the point G, 340 feet away? One would suppose the gas had had time to recover its normal condition before reaching the latter point. What were the conditions at G, which were so favorable to the formation of the crystals? The main was laid at this point at a depth of five feet in made land—the filling is gravel, and is of the same character the whole length of the main under consideration. Could a little water at the drip cause chill enough to produce the effect? Or were the crystals formed nearer the drying house with the first cooling of the gas, and held in suspension in the gas and carried along with it until they met the first obstruction, which happened to be at G, and were there deposited? Or, is the reason still another one? Of course, you have noticed the trouble occurred at the lowest point in the main, where, of necessity, there must have been the least pressure. A law in physics is that compression of gases is attended by liberation of latent heat; and conversely, with expansion of gases there is absorption of heat. Now, just at the lowest or turning point where the pressure is the least, and the gas starts up the steep incline where the pipe rises ten feet in 140 feet, the motion must be accelerated in a degree, attended by more or less expansion with its accompanying chill. This is followed by a condensation of watery vapor, which, in turn, has the faculty of dragging down with it the crystals from the naphthaline vapor. Undoubtedly, the conditions are favorable to the condensation of watery vapor somewhere in the part of the main under consideration, for at the drip at A we get more water the year round than at any other in the city with one exception, notwithstanding the fact that there is less than 850 feet of 4 inch pipe taken care of by this drip.

Now, if any one of these theories is the correct one, why are we not troubled all the year round at this place? Why are we troubled in August, and not in November or December? The drying house has been built over the pipe for years, and we have had about the same amount of water from the drip year by year. As for an explanation to fit all the conditions of the case, I have had to give it up.

Discussion.

The President—Mr. Snow has stated a difficulty regarding which he would like to hear an explanation at once intelligent and practical. Perhaps Col. Benson, of Brooklyn, N. Y., can make plain the difficulty experienced at Holyoke.

Col. Benson—I have always found it to be the case that there are four who can ask questions to one who can answer them. I certainly have as many curious performances in my mind in respect to naphthaline as were stated by the gentleman who read the last paper. My napthaline experience can be located all the way from the condensers to the drips in the holders. One napthaline peculiarity, which I recall as having happened at our works, while not at all answering the question, may throw some light on the subject. We were troubled with naphthaline at a point 600 feet distant from the works. It occurred at a drip which was provided with a 2-inch pipe connected with a 20-inch pipe, and perpendicular to it. About three times each year, at certain changes of temperature, it would stop solidly up with naphthaline. All the drips on that line of pipe for about half a mile, are made in the same way, but none of the others ever stopped with naphthaline, while this particular one would invariably become clogged up about three times a year. On digging it out we would find a solid mass of naphthaline crystals. After burning it out and slushing it on the inside with a liberal allowance of tallow to prevent the naphthaline from sticking, it would be sure to fill up again in another three months. Getting tired of this we put in a 20-inch drip in the line of pipe, and remedied the difficulty. While we are not so well acquainted as some others with the nature of the substance which annoys so many gas manufacturers, we do know that it makes its appearance at a sudden lowering of the temperature. I think I have had some experience in the formation of naphthaline in a 20-inch pipe which may not have fallen to the lot of many gentlemen in the room. The 20-inch pipe which connects our holder with the works is about half a mile in length (no holders are at the works) and has been in service for about 15 years. Last winter the pressure in the main increased rapidly from naphthaline, and finally completely stopped it up. We had there an accumulation of naphthaline of 15 years' formation. There are many methods with which we are all familiar to clear out naphthaline. Naphtha, steam or hot water can be used, but none of these seemed to be practical for the case in hand. It occurred to me that a thorough brushing and cleaning out of the pipe, followed by the removal of the deposit to the foul lime pile would be better than to melt it and run it in the drips. We cut the pipe every 75 feet and put in and drew through it circular rattan brushes of 16, 18 and 20 inches diameter—one after the other. By putting in a joint of gas pipe between those cuts the broom was pushed along, and when pushed to the end of the pipe, a line being attached on each side, it could be drawn back and forth through the pipe. The brushes were drawn in this way through about one-half mile of the main, and when the job was accomplished the pipe was just as clean as the day it was cast. This seems to me to be the only practical method of getting rid of this very troublesome matter, which gives us so many anxious days and sleepless nights, along with so many wearisome problems to discuss. I disclaim any intention of answering the question propounded by the writer of the paper, and am much obliged to you for affording me a hearing at all.

The President—Can some other gentleman enlighten us on this mysterious subject?

Mr. Cabot—I do not know that I can enlighten you, neither do I consider myself a gas man at the present time; but if it is any satisfaction to the gentleman who read the paper, I may state that some years ago, when I had charge of a gas works, we had similar trouble to that mentioned by him. A pipe which passed through the Pacific Mill yards (Lawrence, Mass.) became stopped, and on cutting it open we found it entirely filled with naphthaline—it was where the pipe passed very close to the base of the tall chimney which was connected with the furnaces in the mills, the ground about the chimney being very hot. In order to remedy the difficulty we had to cut it open in places, and finally to cut the pipe off. I attributed the deposit to the changing temperature. The gas passed this chimney, and while passing through the hot current of air and then into a colder current, the naphthaline was deposited. We overcame it by putting in a larger pipe, and I am not aware of any trouble that has occurred at that location since.

Mr. Snow—How far away from the chimney was the pipe?

Mr. Cabot—Within two or three feet from its base.

Mr. Snow—How far away from the base of the chimney did you find the naphthaline?

Mr. Cabot—I do not recollect. I should think the whole distance between the chimney and the works was about 150 feet.

On motion of Mr. Stedman a vote of thanks was passed to Mr. Snow.

Adjourned to Wednesday, February 16, 1888, 10 A.M.

(To be concluded.)

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FRIDAY, MARCH 2, 1888.

The Market for Gas Securities.

The city market for gas shares still remains practically inanimate although quotations are furnished with amazing regularity. The brokers are complaining bitterly at the unwillingness of holders to accept the bid prices, but the brokers as a rule are not investors; hence their tears. The undertone to the market is strong, and we expect that before long Wall street and Exchange place will have plenty to do on a rising market. Nominally, Consolidated is at 75¼. Mutual has improved a point within the fortnight, and Equitable has followed suit. Both these stocks look cheap.

Brooklyn shares are dull and strong, Williamsburgh leading in regard to last-named feature. The Citizens Company's stockholders are becoming restive over what they denominate excessive charges for executive management; and a revision of the salary list does not seem improbable.

Eastern securities are active, at advancing figures. California gas shares are also firmly held. Washington (D. C.) gas is bid for at 187½. The outlook at Frankfort, Ky., for a renewal of the Louisville Company's charter is very favorable. Messrs. Morris and Barret make a pretty hard team to beat.

Notes from the West.

By RETORT.

FEB 25, 1888.

Washington's Birthday, being the "opening night" of the local electric light company, had been set apart by the town of Anna, Ills., for a grand "Electric Ball." A queer circumstance, however, has arisen which effectually prevented the electrical display, if not the "ball," also. The Company located their works on one side of the Illinois Central Railroad tracks, while the town is on the other. The town was poled, and all was in readiness for wires, when the railroad folks stepped in and forbid any poles on their right of way, which is 100 feet on each side of their track through the entire State.

Xenia (O.) has taken another twist at her already complicated gas question. It will be remembered about a month ago charges were publicly made that "boodle" had been used by the Gas Company with the members of the City Council. These charges immediately followed the passage, by a close vote, of a new ordinance for the Gas Company regulating the price of gas at $2 per M., and $26 per annum for public lamps. Before this contract could be put in force, however, the City Solicitor swore out an injunction. Very recently this injunction suit was tried before Judge Havens, but came to a sudden termination, when the attorneys for the Gas Company signified their desire to have the injunction made perpetual. This will bring the case before the Circuit Court, at its March term.

Among Western gas men the topic just now is the Convention, in May. Unusual preparations have already been made, and, under the management of President McMillin, the Convention will unquestionably be the best ever held. Delegates will have a very fine opportunity to examine and investigate the merits of the new incandescent gas burners, the Fahnehjelm and the Welsbach people each having displays in the city. The latter are very nicely situated in a large room, fitted with a photometrical apparatus, so arranged that the burners can be seen under either coal, water, fuel or natural gas.

The *Insurance Monitor* says:

"You will be told that gasoline is a perfectly harmless creature. So it is, when at a safe distance from fire; and when we say a safe distance we don't mean a few feet. The difference between gunpowder and gasoline is this: Gunpowder is harmless, if you keep fire away from it, and it will stay where you put it. Not so with gasoline. The stuff has been known to send a vapor close along the floor or ground a distance of 200 feet, to frolic with a lighted lamp, gas jet or open fire. Gunpowder resents fire; it acts on the defensive. Gasoline hunts fire; acts on the aggressive. Therefore be very cautious when you harbor gasoline about your premises. Coroner's records upon this subject are more reliable than the silver tongue of the man who has a gasoline lamp or a gasoline stove for sale."

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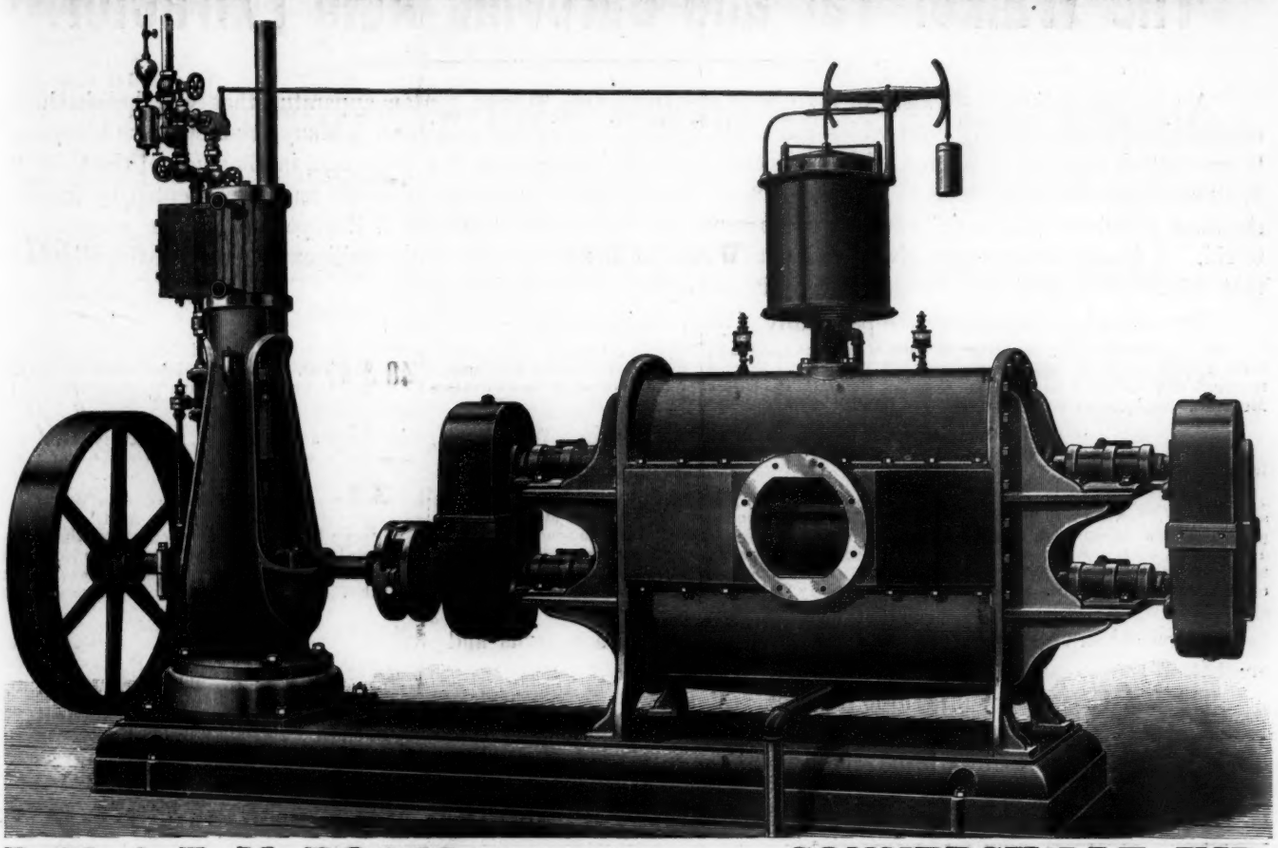

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JOHN H. McELROY, Engineer.

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Yours truly, E. McMILLIN, V. P. & Gen. Mangr.

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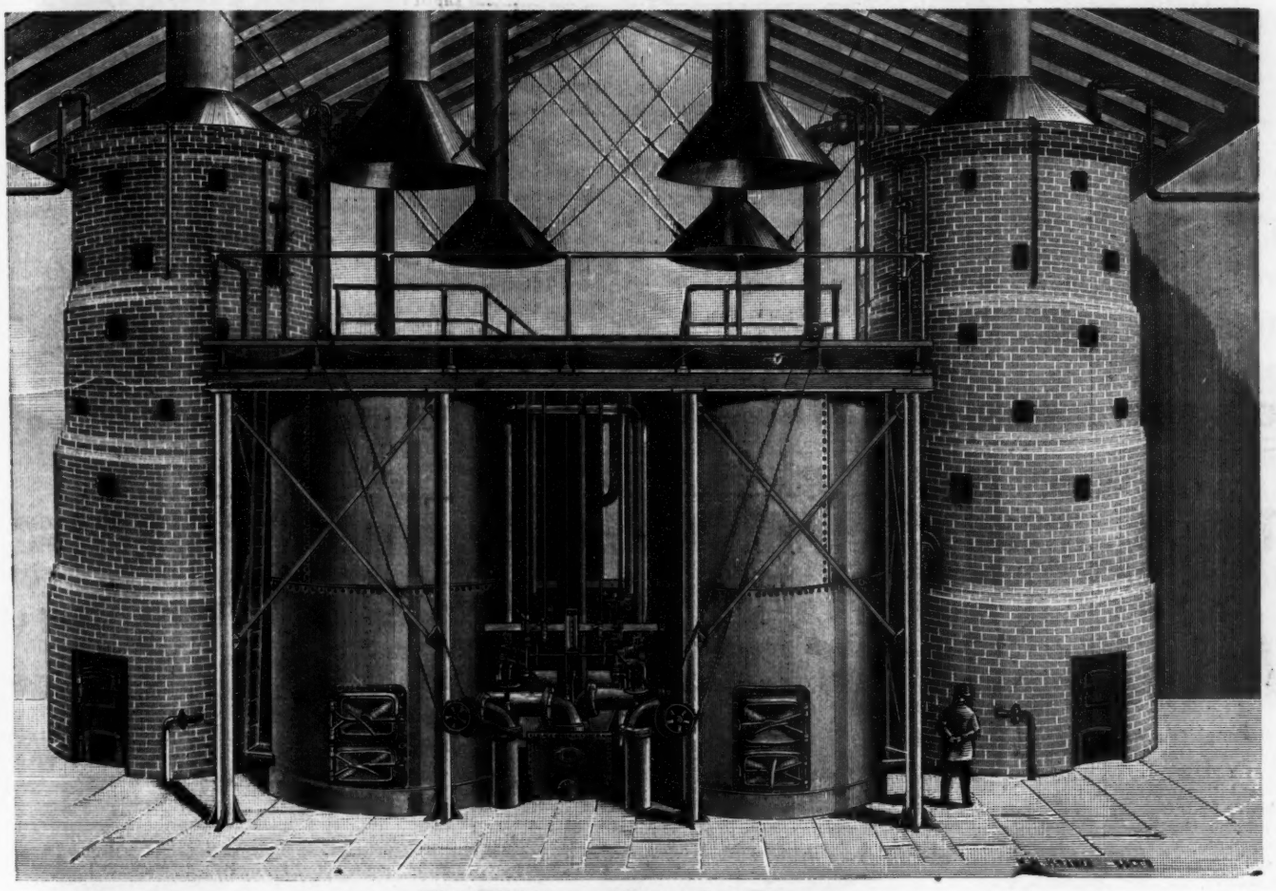

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Madison City Gas Light Co.	Madison, Wis.
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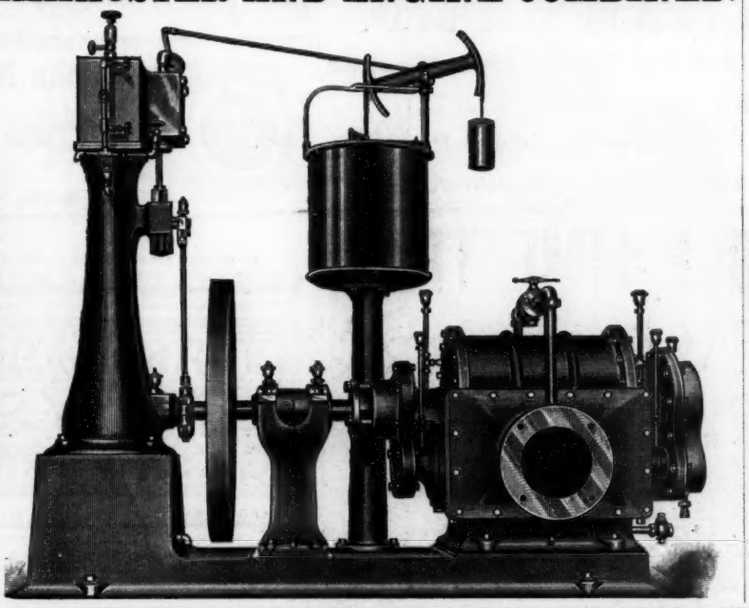

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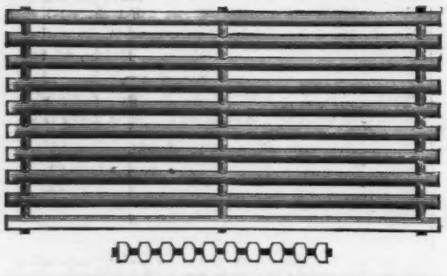

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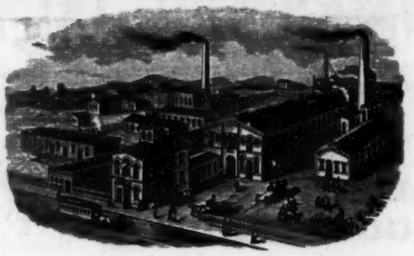

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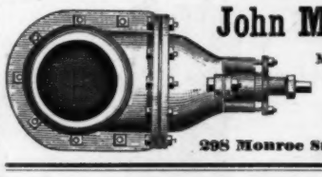

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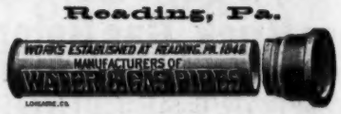

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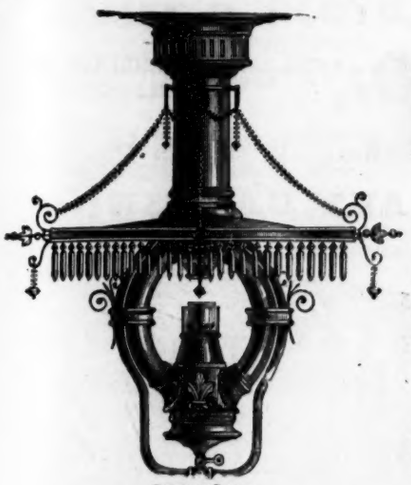

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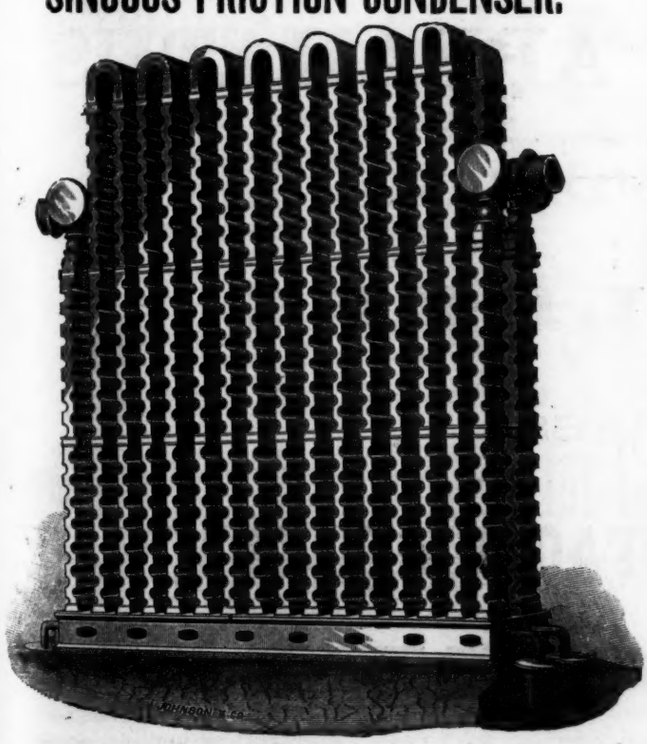

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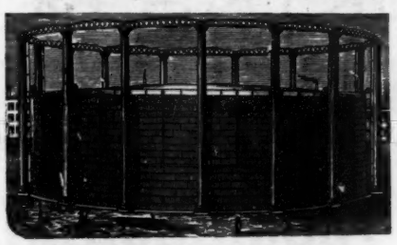

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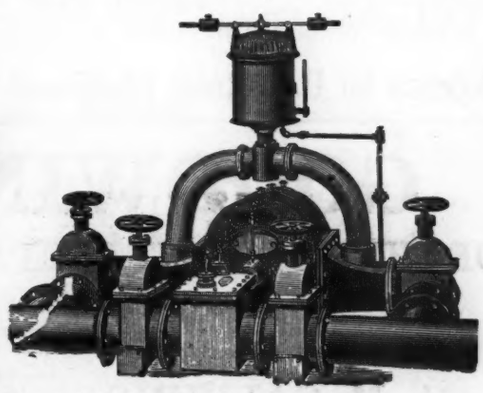

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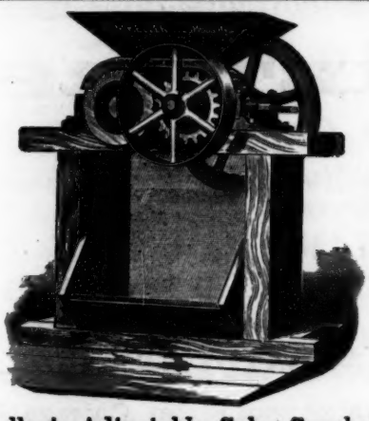

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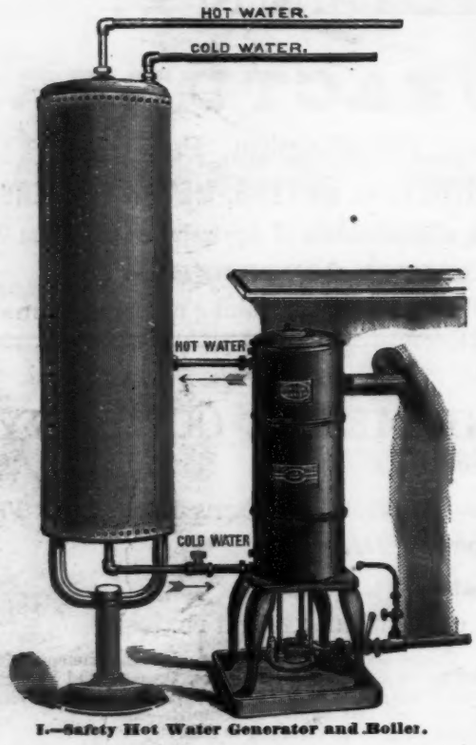

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